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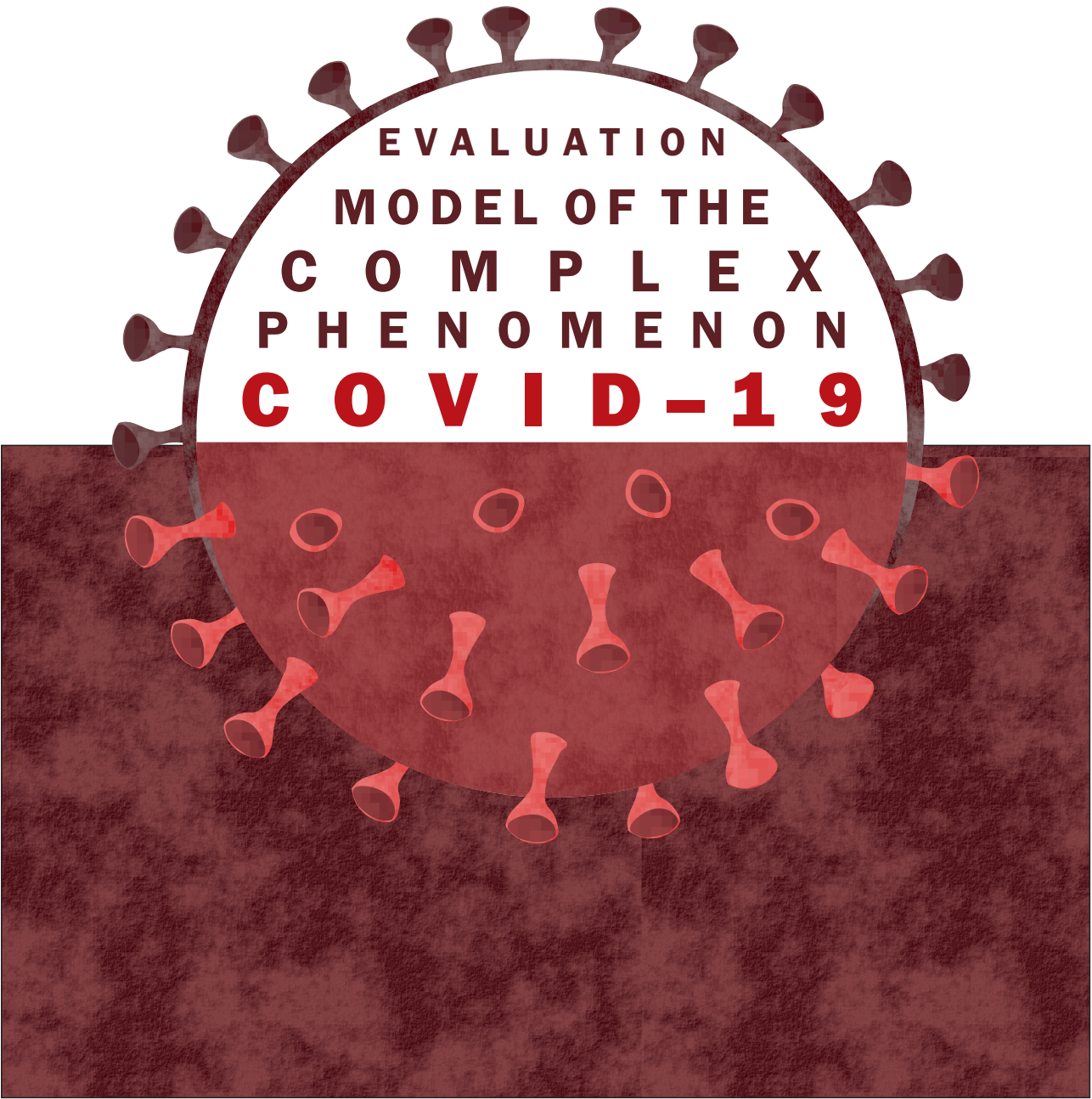

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EVALUATION MODEL OF THE COMPLEX PHENOMENON COVID-19

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Content

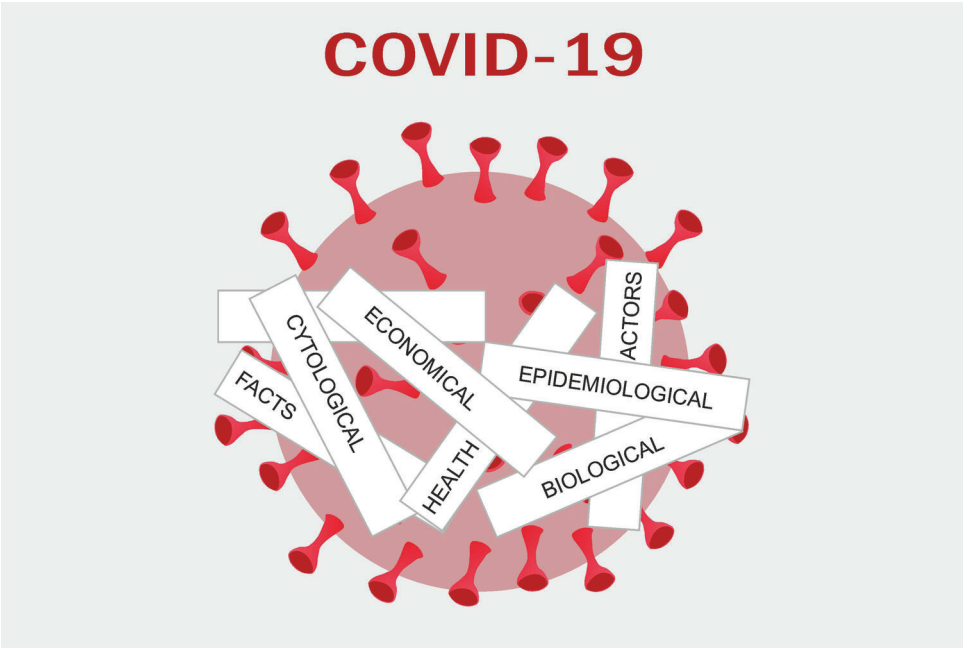

Figure 1. An example of a complex phenomenon

Prologue

According to Parisi (2013), there are many possible definitions of a complex system or phenomenon. A complex system is one whose behavior crucially depends on the details of the system itself. This dependence is often very difficult to understand. In other words, system behavior (e.g., the COVID-19 pandemic) can be extremely sensitive to details leading to large variations in the behavior of the system itself.

The model for evaluating complex phenomena, such as the COVID-19 pandemic, is based on several assumptions:

1. COVID-19 is a complex phenomenon like all natural phenomena: biological, sociological, economic, political and all others because by their nature they are complex.
2. We evaluate not only the facts but also the agents who produce the facts.
3. We consider the evaluation process as an intertwining of the complex and the complicated. Conceptually, complex and complicated, layman-like words have different meanings here.

The COVID-19 pandemic is a model that can be considered a mixed model in the sense that we resonate in two ways, qualitatively and quantitatively.

Finally, evaluation is a dialogical model. The dialogue model does not criticize but educates agents for better future interventions and evaluations of those interventions.

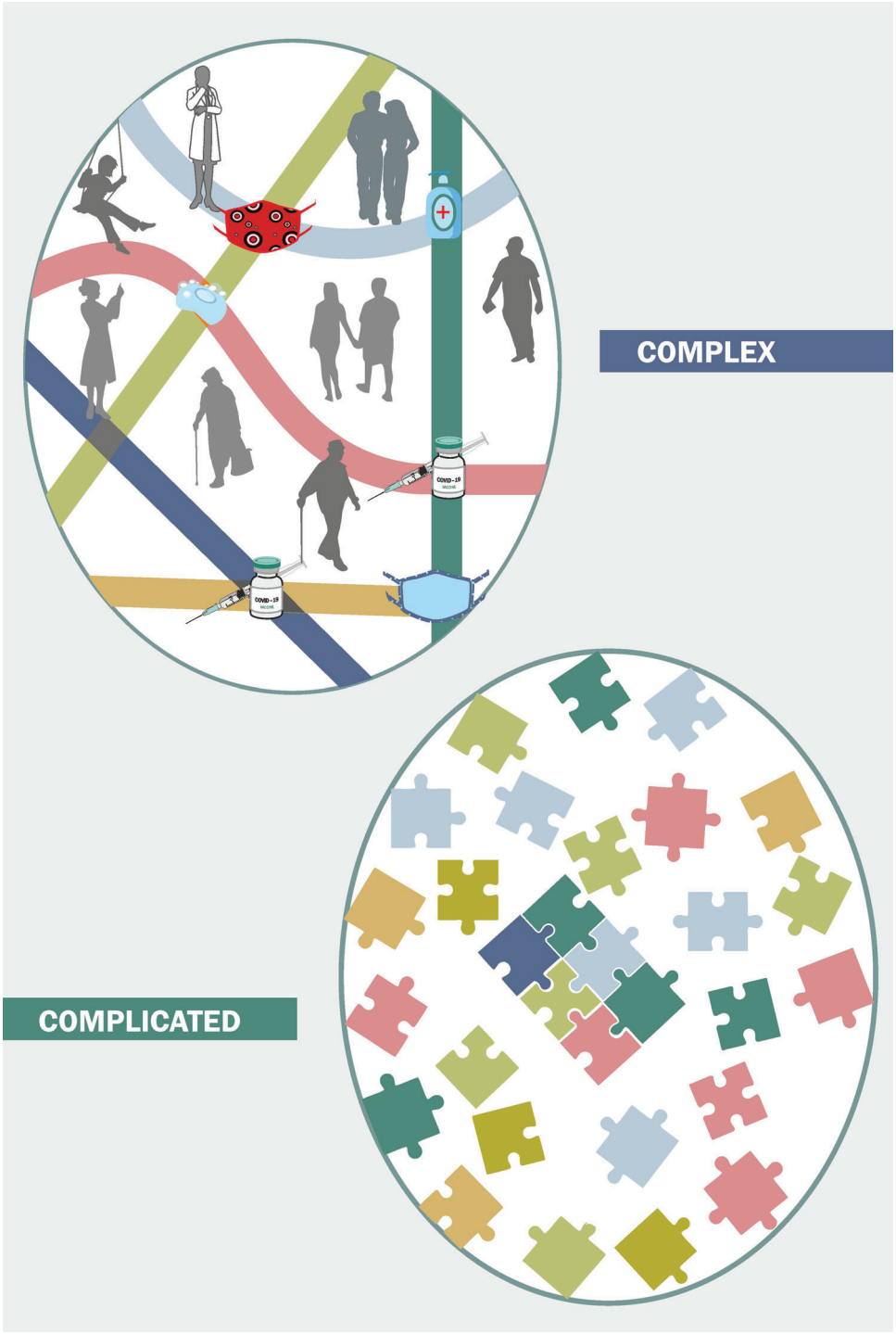

Figure 2. Complex vs. complicated

Complexity vs. Complexity

Complex and complicated are words having the following definitions:

Complex, having many parts connected together in a particular pattern, difficult to understand or explain because there are many different aspects of the people involved.

Complicate, to make something more difficult to do, understand or deal with.

“Complicated” presupposes an ordered universe in which cause-and-effect relationships are apparent, and correct answers can be determined based on facts. For example, the Jumbo Jet is complicated, the COVID-19 pandemic is complex.

Snowden (2007): In the context of the “complicated”, there is a clear relationship between cause and effect because everyone can recognize it. “Complicated” is the realm of ‘known unknowns’. While in the context of “complexity” the researcher must feel, categorize and respond to the situation, in the context of “complicated” the researcher must feel, analyze and respond to the situation.

In the context of “complicated”, everything is evidence based. In “complex” situations, there is no order and the analyzes are based on pattern recognition.

In any case, if possible, we do both approaches to research, first through complexity and then moving on to complicated.

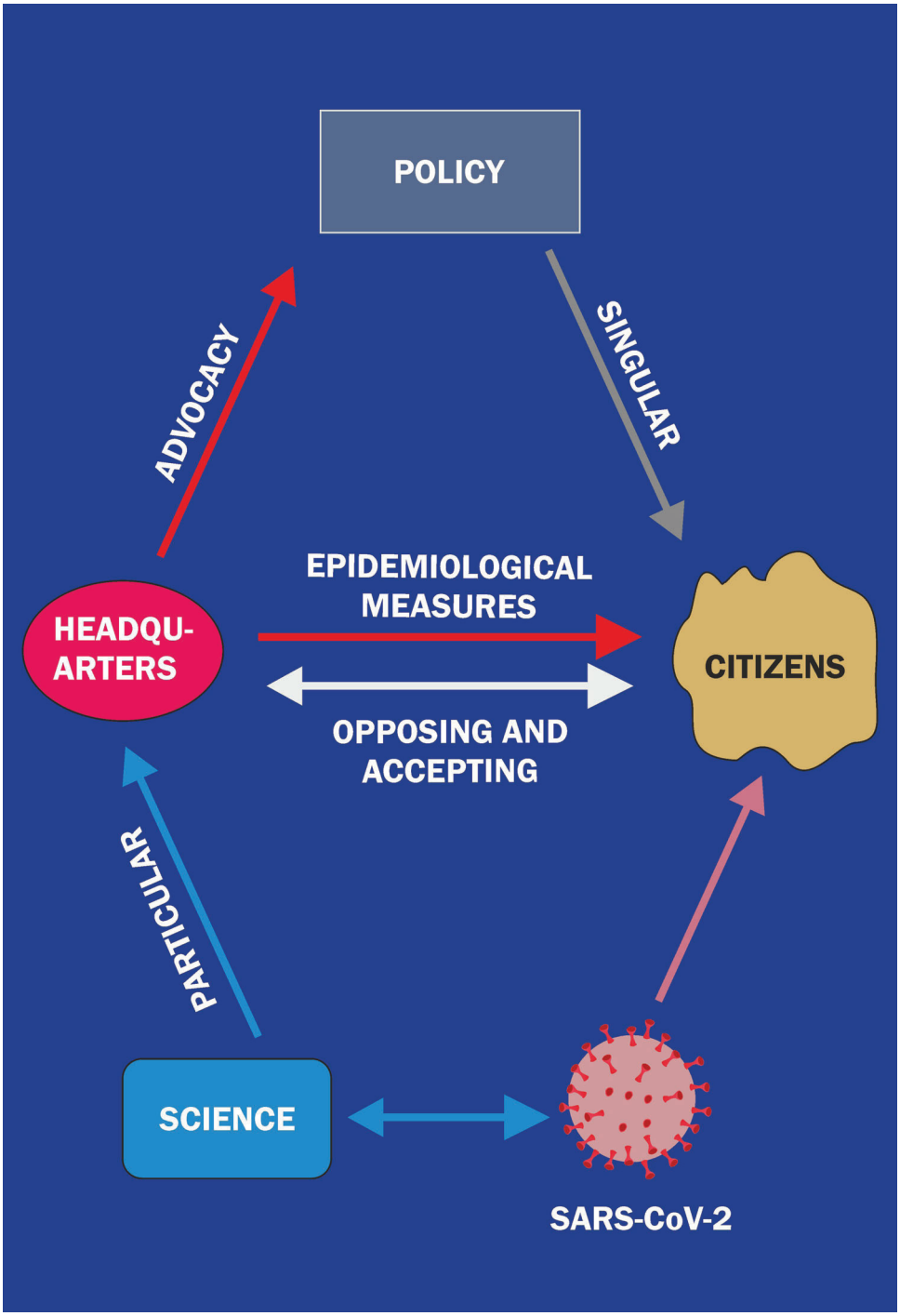

Figure 3. Agents in the COVID-19 system

Understanding complexity

It is extremely impossible to capture the essence of what is happening in a whole range of complex phenomena (e.g. during the COVID-19 pandemic).

The methodology for understanding complexity is more narrative and qualitative than quantitative. There are number of features we need to understand:

- many elements, known and unknown.
- networking with possible nesting or loops, often with incomprehensible relationships between elements or networks.
- nonlinearity, it is difficult to follow the causes and consequences; side effects are common.
- emergence and / or self-organization: the emergence of unplanned patterns or structures that arise from processes within or between elements; unintentionally, striving for continuous maintenance.
- tendency towards chaos and cascading sequence of events.
- exploiting points where the outcomes of the system can be influenced but cannot be controlled.

Defining systems and their agents, and describing their communication channels is the first stage in understanding complexity:

- We define a system as a set of elements acting together as parts of a mechanism or interconnected network - a complex whole.
- Agents are defined as key influential persons or institutions in a system, or as some other entities in the system. The role of agents is especially important in developing and solving problems. Individuals and institutions are agents responsible in decision-making processes.
- Communication is the process of exchanging information in a pre-agreed manner, ie the process of sending information to any entity, most often by speech or writing.
- Communication channels include, for example, press releases, social networks, and various other communication options, as well as various intervention instructions.

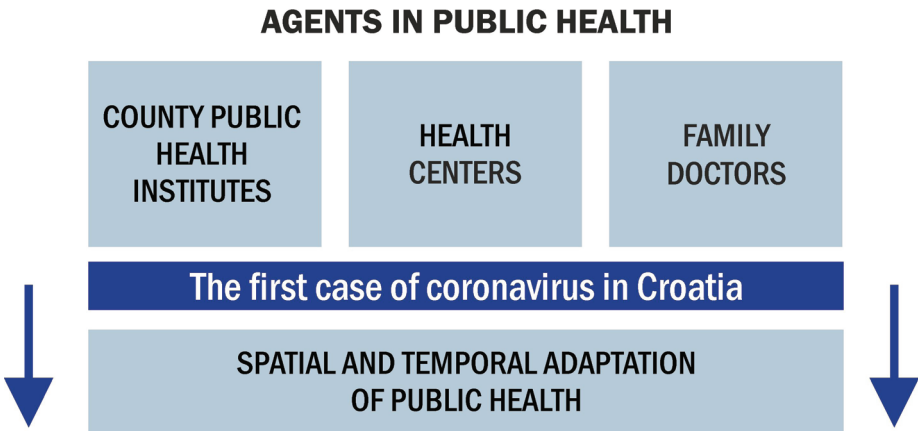

Figure 4. Adapting the public health system to new conditions

In February 2020, when the first case of COVID-19 appeared in Croatia, there was a well-organized public health system (agent), with historical experience - activity in the prevention of infectious diseases. In each county there are public health institute (agent), several health centers (agents), and numerous family doctor clinics (agents). Websites (https://www.koronavirus.hr), press conferences of the Civil Protection Headquarters etc. appear as communication channels.

Based on such an organizational structure, two phenomena have been developed during the pandemic (complex system): adaptive networks and touch space.

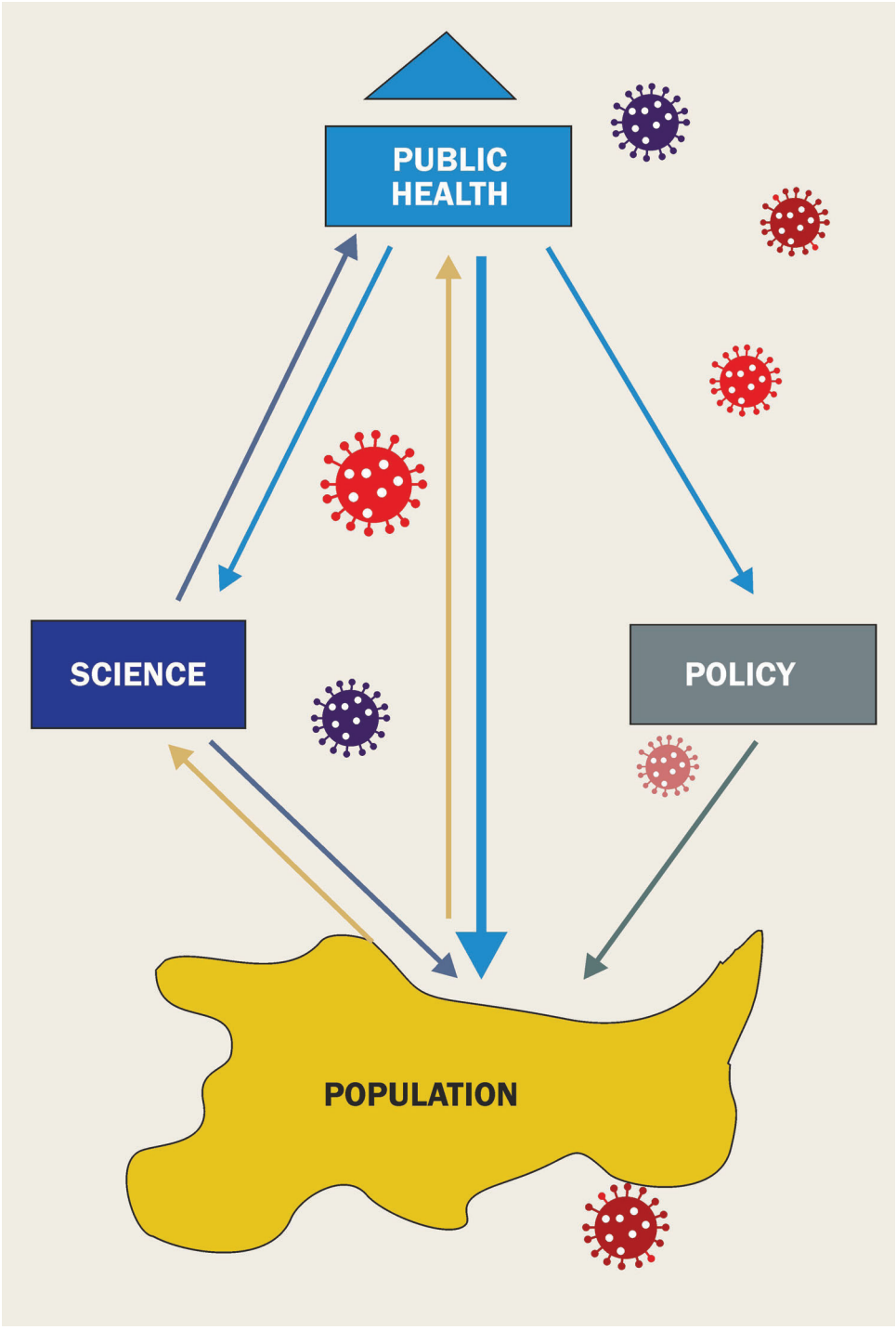

Figure 5. Adaptive network

Adaptive networks

Adaptive networking is an approach that extends the concept of autonomous networking to transform a static network into a dynamic, programmable environment driven by analytics and intelligence. The static network is an existing public health organization. During an epidemic, agents develop a new network, nonlinearly, through different information channels. The result of their actions is a new dynamic system in the fight to overcome the pandemic. The dynamics of the system are fundamentally changing from lower levels of connectivity (basic public health organization) to higher (new organizations of the dynamic system). In this way, a dynamic system shows more of the characteristics needed to succeed in any pandemic environment with successful organization without centralized regulation. During the evolution of a pandemic, the following communications are formed between systems:

1. Communication between agents of the public health system (national civil headquarters) and citizens, where the COVID-19 infection is transmitted through touch spaces.
2. Communication of science agents with agents of the public health and citizenship system.
3. Communication between public health agents and policy agents, especially health policy.
4. Communication between policy agents and citizens.
5. Communication of hospital system agents with the public health and citizenship.
6. Communication of SARS-CoV-2 (virus as agent that mutate creating variants) with all systems.

Any communication function separately is networked through different communication channels (television, social networks, print media, telephones, e-mail, etc.). The roles of individual agents are changing, they are adapting to development of events. Thus, the national headquarter hands over the decision on lockdowns to the county civilian headquarters, and takes over the coordination function itself. The network is constantly adapted depending on events (citizens' reaction to staff decisions, elections, celebrations of historical events, funerals of celebrities, church celebrations, etc.), new communication channels are being created, and some of the existing ones are being shut down.

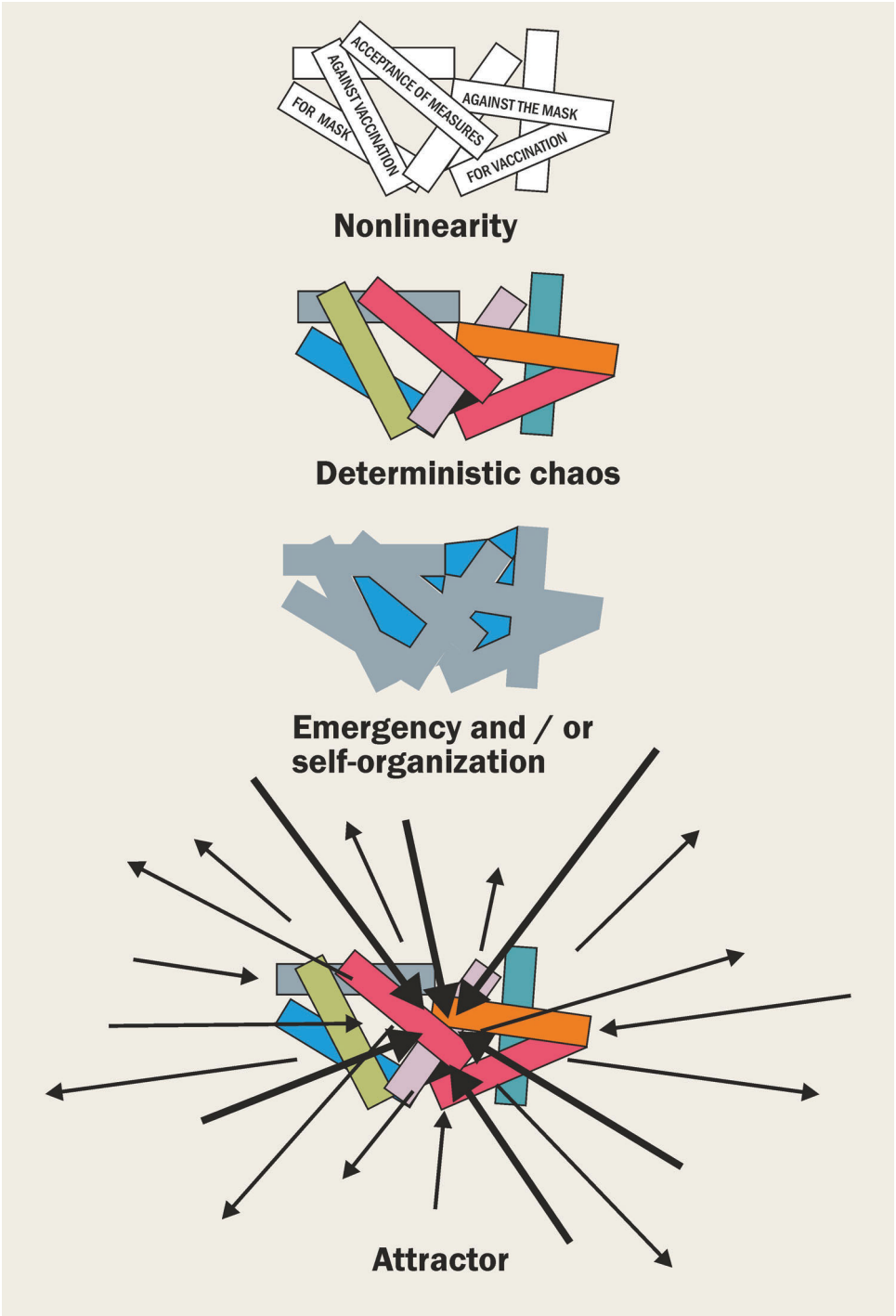

Figure 6. Adaptive network characteristics

Adaptive networks have the following characteristics:

- **Non-linearity** of connectivity (unpredictability of outcomes) occurs in cases when, for example, the population, citizens, unpredictably reacts to the measures of public health agents (national headquarters), some accept, some openly refuse, and some pretend to accept - feedback can be positive or negative). Various patterns of citizen behavior are emerging, such as anti-maskers, anti-vaxers, disagreements with health policy, disagreements with the media, and a number of other oppositions.

  Positive feedback is the process of continuing to implement epidemiological measures (eg in the COVID-19 pandemic). The opposite is negative feedback, ie non-implementation of epidemiological measures.

  In the perspective of complexity, intervention A does not predictably lead to outcome B. In complex systems, there is no predictive and causal analysis, that is, causality in complex situations is interpreted philosophically subjectively.

- **Deterministic chaos** that points to different analytical options needs to be distinguished from the usual understanding of chaos. Usually, the term chaos means complete disorder in a phenomenon, confusion, disorder or state without any order.

  Thus, in describing the COVID-19 pandemic, we need to distinguish deterministic chaos, which means pattern-based options in analysis, from the chaos caused by a state of total disorder - the entry of new COVID-19 cases into the system and the possibility of their disposal. Deterministic chaos means nothing more than a few free analytical options. For example, in a COVID-19 pandemic, chaos would occur if the emergence of new cases blocked hospital capacities that could no longer care for new patients.

- **Emergence and / or self-organization** - unplanned patterns or structures created from processes within or between elements. It's not intentional, but it tends to keep recurring. In a complex context, the researcher must feel, categorize, and respond to the problem. Anti-maskers and anti-vaxers are examples of self-organized phenomena during a pandemic.

- **Attractor** is an issue, quality or feature, stimulus or sounding by the leader or some other entity, which in the population provokes interest, affection, desire, action, organization, etc.d.

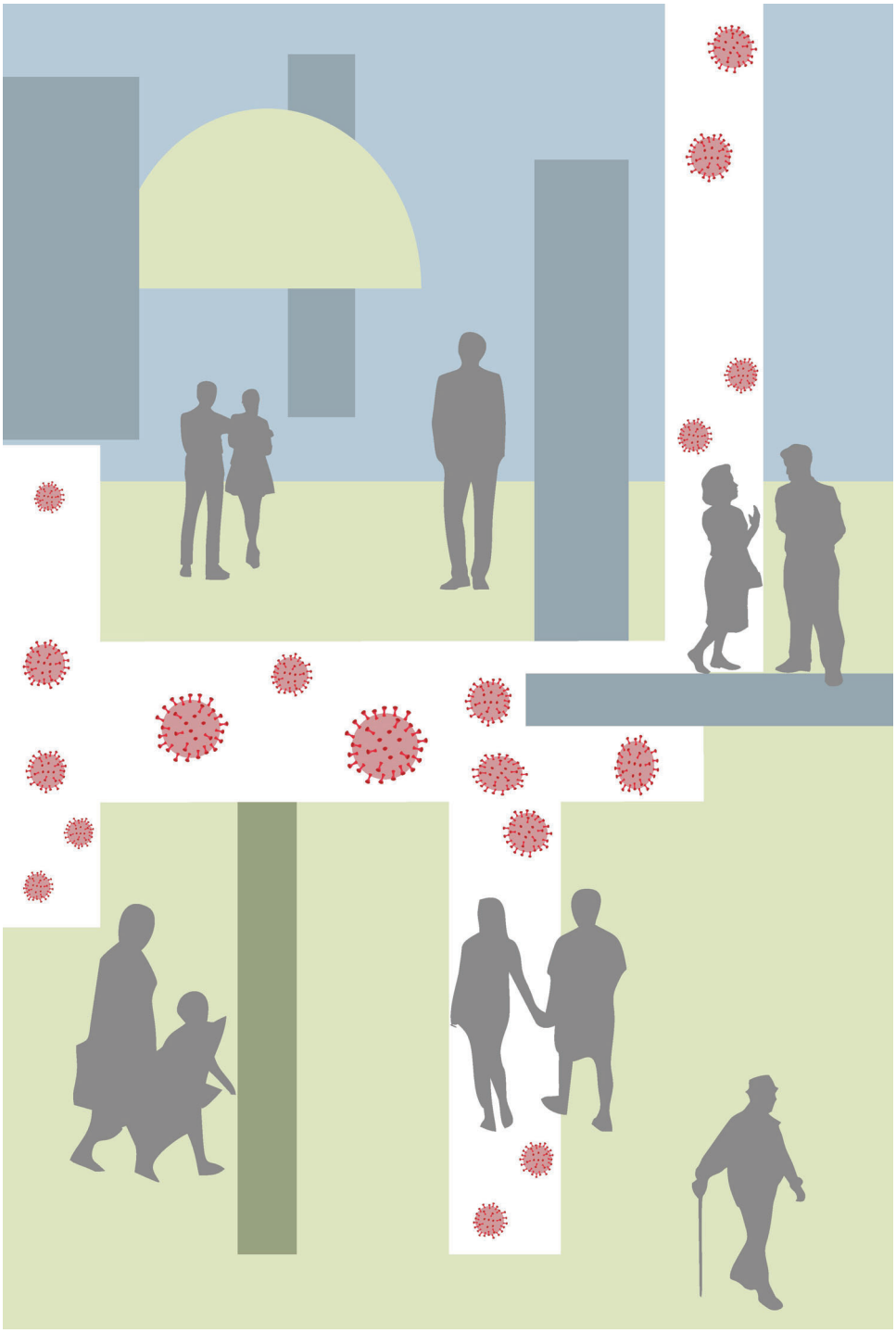

Figure 7. Touch space

Touch space

Infection of the population (e.g., COVID-19) depends on individual exposure to SARS CoV-2 virus. The susceptibility of individuals and the contagiousness of the virus variant play a certain role here, as well as the capacities of the health care system, which leads to certain repercussions on the number of recovered or dead people. Diffusion and dispersion of the virus in the air, deposition on surfaces, infection by respiratory and other means (e.g., eyes), genetic and cellular responses to the virus attack are accompanied by complex pathology involving several organs.

In everyday living space, people become infected with the virus through four types of exposure:

1. Exposure of the body - refers to the physical body or daily physical presence, including everything we feel, discover, hide and share through our body,
2. Exposure to time - the time we experience it,
3. Exposure to space - it can be a sense of space, our subjective experience or the actual space in which we find ourselves,
4. Relationships between people - refers to the relationships we establish and / or maintain with others.

The touch space is a fundamental term for understanding public health interventions in the suppression of the COVID-19 pandemic. The human relationship to the virus in the touch space is an important parameter of COVID-19 infection. During a pandemic in the touch space, viral replicator transmission to the human population takes place. In normal situations, touch space is a completely unconscious event for a person. During a pandemic, people become aware of the space of touch, and every citizen needs to develop their own space control plan.

Intervention in the COVID-19 pandemic for agents means: to form a successful model of locking and unlocking the touch space.

The space of touch is an individual characteristic, described and conditioned by social and cultural factors. An aware citizen needs to develop their own space control plan.

The fact is that many citizens during the pandemic find it difficult to develop personal prevention of infection with COVID-19.

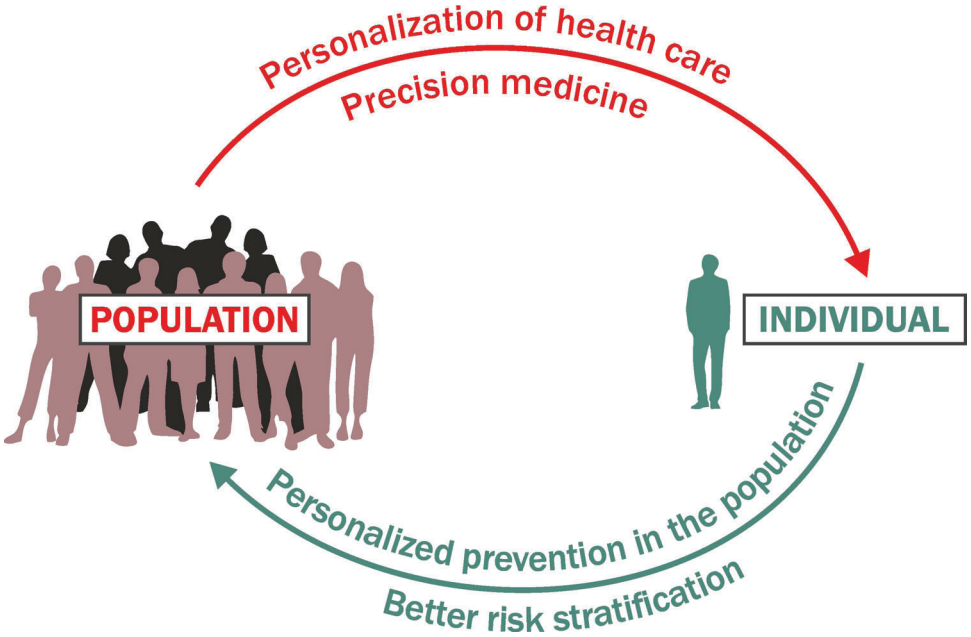

Figure 8. The process of adaptation in the touch space

As far as the researcher himself is concerned, the problem of complexity is in fluctuation and unpredictability, cause and effect can exist, but they are understandable only in retrospect. There are no real answers, but in practice something still needs to be done - a protocol that is unlikely to succeed.

Merleau-Ponty (2004) allows us to rediscover the world in which we live, but such a world in which the threat of infection must be forgotten. We are now adapted to how our bodies live in space, what our bodies touch and what our bodies touch in a way that did not exist before.

The danger of the COVID-19 pandemic lies in our inability to control the space we live in. Space is normally an unconscious category, which we need to be aware of in pandemics. In the future era of personal medicine we need to develop personal prevention.

Selection of a particular problem that emerged from the COVID-19 phenomenon

Question:

Why do citizens accept / reject policy decisions?

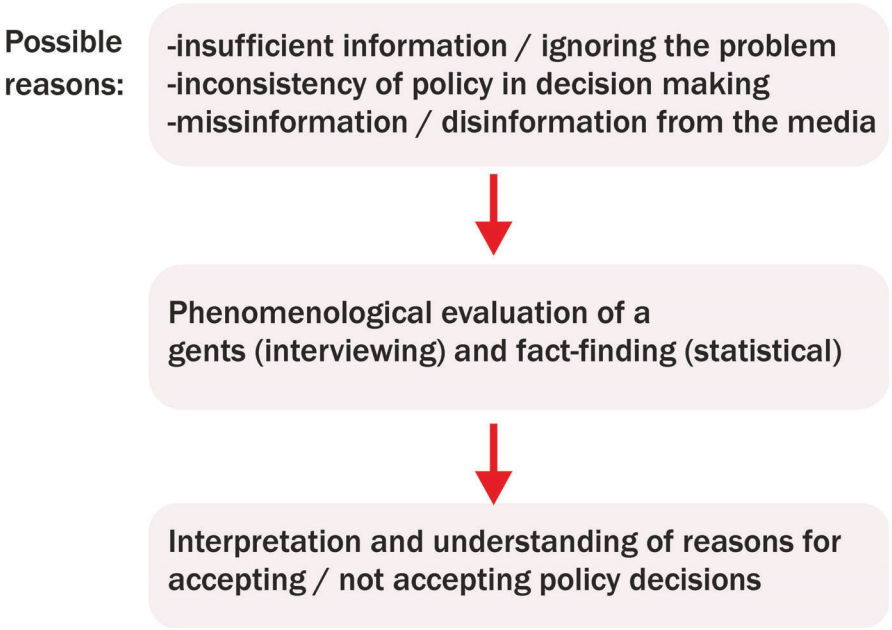

Figure 9. Understanding the complicated

Understanding the complicated

A complex adaptive system exhibits behavior that results from nonlinear space-time interactions between many of components and subsystems.

In the process of analyzing complex adaptive systems and subsystems, the researcher is faced with the problem of how to move from complex nonlinear, heterogeneous, interdependent, nonadditive, asynchronous and highly emergent situation to simple linear, homogeneous, independent, additive, synchronous and weakly emergent.

The researcher should and could move from pattern analysis to fact analysis. This includes collecting and preparing data and selecting the appropriate analysis model.

Data are facts, the basis for reasoning and calculation. Data is a set of values of quantitative or qualitative variables about one or more persons or objects.

Data can be analyzed or used to gain knowledge or make decisions. The essence of data is in their meaning, able to explain and enable understanding of phenomena, systems, or events.

In the analysis of complexity, the main thing is to recognize patterns - about laws in the world, in human design or abstract ideas. The problem is how to turn the pattern into facts - quantitative or qualitative.

As a rule, we wonder whether a linguistic expression (or category) is measurable. If it is not measurable, how can it be made measurable. Measurement means the conversion of a term (which is linguistically described) into a variable on a nominal, ordinary or interval scale.

The researcher must find in complexity a certain phenomenon that he can measure. For example, in the analysis of complexity, he identified a communication channel between public health agents (national headquarters), population, science and politics. In the time interval from February 1 to May 31, he could count the number of active and hospitalized cases and present it as a scatter plot.

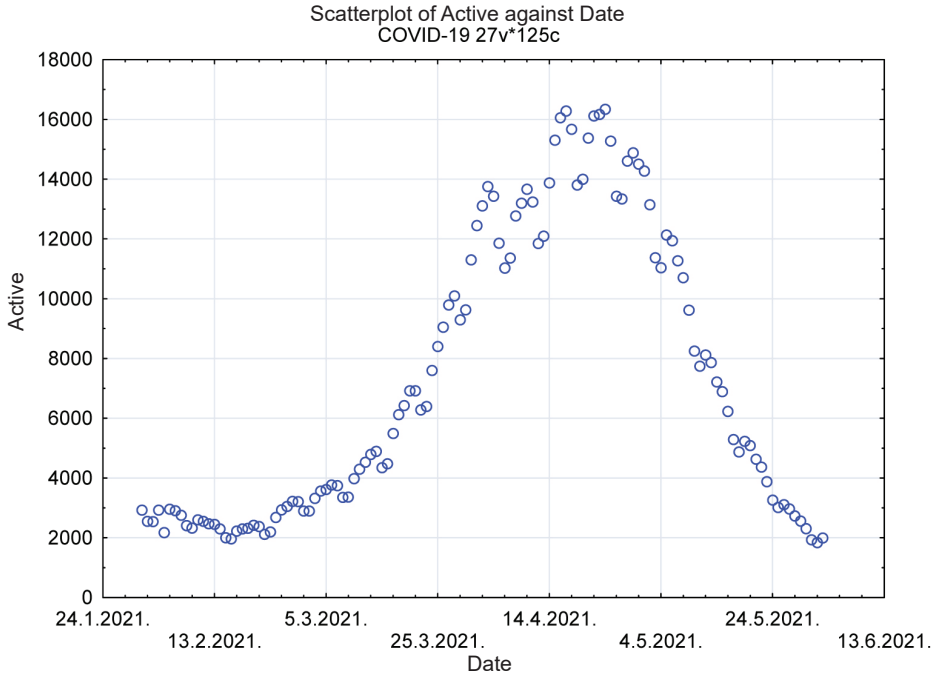

Figure 10. Active cases in the observed period

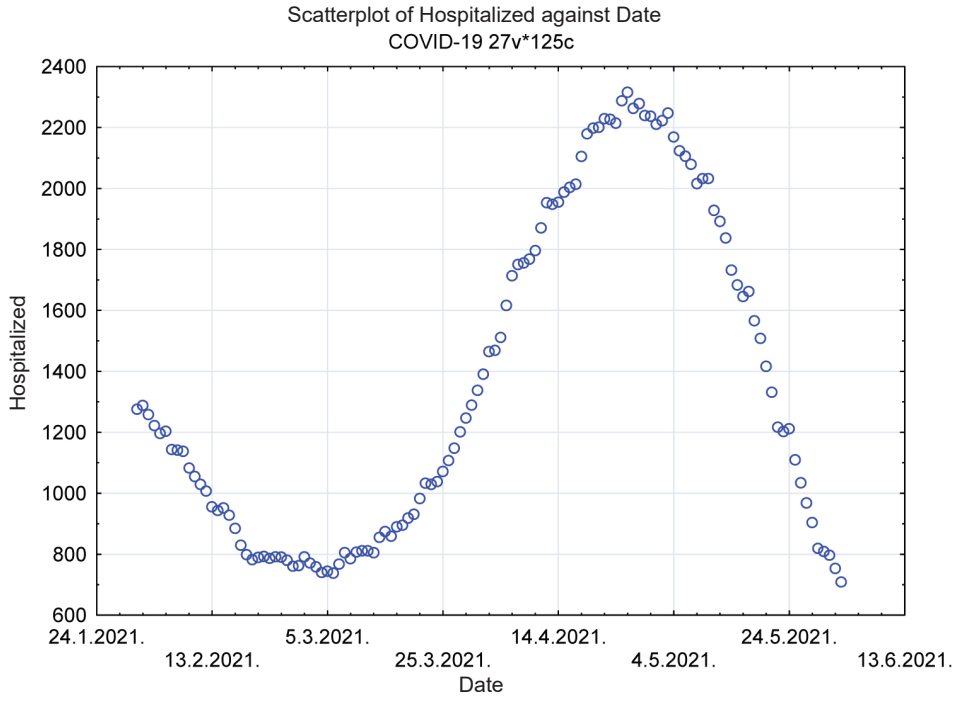

Figure 11. Hospitalized cases in the observed period

An example of the reduction of the COVID-19 complex phenomenon

Let's try to reduce the complexity of the COVID-19 pandemic to the complicated problem of predicting the hospitalization of infected people. Increasing the number of newly discovered COVID-19 positives, potentially requires increased use of hospital capacity. The problem is to identify data that describe the problem of predicting the required hospital capacity, their possible connection.

The data we identified are number of active and hospitalized cases in the period from February to May 2021 (Figure 10)

The number of active cases begins to rise in late February (around February 26); it reaches a maximum towards the end of April (around April 30), followed by a decline in the number of active cases. In the period of growth, the number of active cases ranges from approximately 3,000 to just over 16,000. In the period of decline, towards the end of May (around May 27), the number of active cases falls below 3,000 (Figure 11).

The number of hospitalized cases in early February falls (from 1,300 to just under 800) and reaches its minimum in early March (around March 5). followed by an increase in the number of hospitalized (with a small delay of about a week, given the number of active cases), and the maximum is reached at about the same time as the maximum number of active cases (end of April).

How many infected (active, sick) people occupy hospital capacities? Can the need for hospital capacity be predicted if the number (or trend of change) of active cases is known? (Figure 12)

The potential indicator (I1 = number of hospitalized according to the number of active) changes in the observed period according to the U-curve pattern. It reaches its minimum curve around April 5th with a value of "10 hospitalized per 100 active cases" (Figure 12). Thus, I1 reaches a minimum at a time when both the number of active and the number of hospitalized reaches their maximum. On the other hand, in the case of growth of the observed variables (active, hospitalized), the I1 indicator shows a downward trend, and in the case of their decline, the I1 indicator shows an increase.

What is the relationship between the observed variables (number of active cases and number of hospitalized)?

It is expected that there is a correlation between the variables (Active. Hospitalized).

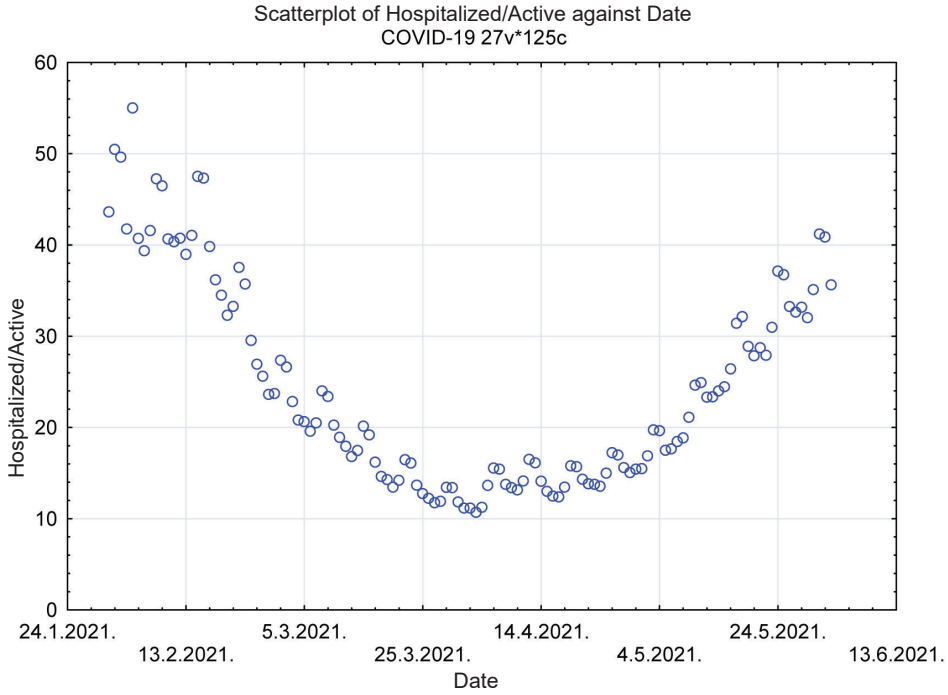

Figure 12. Values of indicator I1 in the observed period

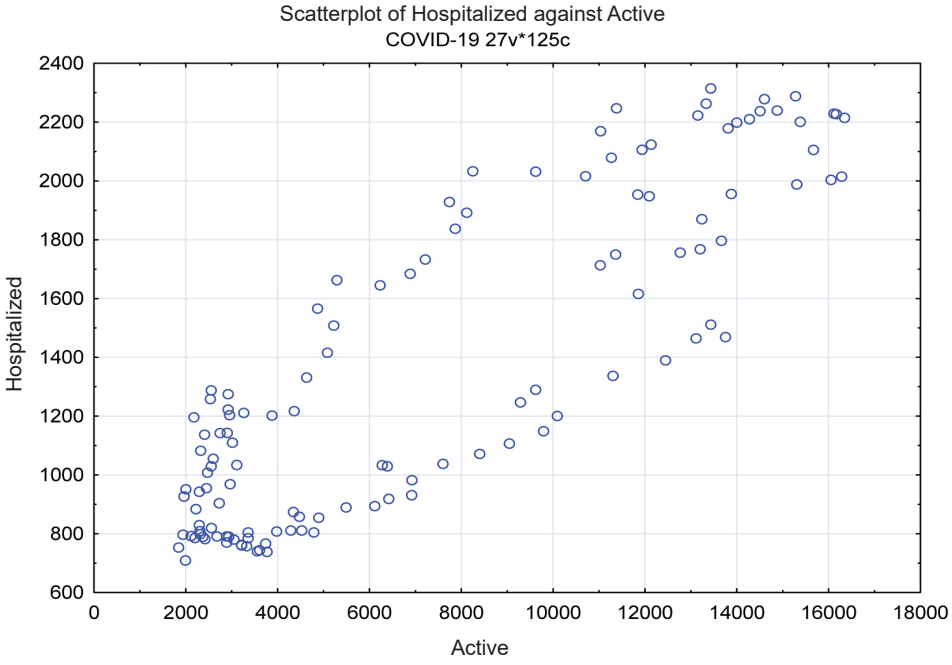

Figure 13. Relationship between active and hospitalized

Figures 10 and 11 confirm a similar pattern, but not throughout the period. The turning point seems to be around March 5, when both curves begin to rise. Prior to that, the number of hospitalized showed a marked decline (Figure 11) while the number of active was approximately constant (Figure 10).

However, Figure 13 indicates the possibility that Active and Hospitalized are interrelated (r> 0.8). The correlation graph (Figure 13) shows one unusualness, the "gap" in the range of values of the variable Active (from 3000 to 11000), which should be taken into account in the interpretation:

1. When the number of active cases is between 3000 and 11000 then there are at least two patterns according to which the infected are hospitalized:
    a. from 800 to 1600 hospitalized, or
    b. from 1,200 to 2,000 hospitalized.
2. When the number of active cases is less than 3000 or more than 11000 then the number of hospitalized does not depend on the number of active cases.

Ad 1.

At least two derived rules are possible:

IF the number of active cases is between 3000 and 11000 and condition1 THEN it is expected to be between 800 and 1600 hospitalized.

IF the number of active cases is between 3000 and 11000 and condition2 THEN it is expected to be from 1200 to 2000 hospitalized.

Ad 2.

IF the number of active cases is outside the interval (3000, 11000) THEN the number of active cases is not a criterion for the required number of hospitalizations.

It seems that some more data should be included in the analysis because the number of active cases and the need for hospitalization are not sufficiently informative variables in the sense that there are several other things that could affect their values (data: number of active, number of hospitalized).

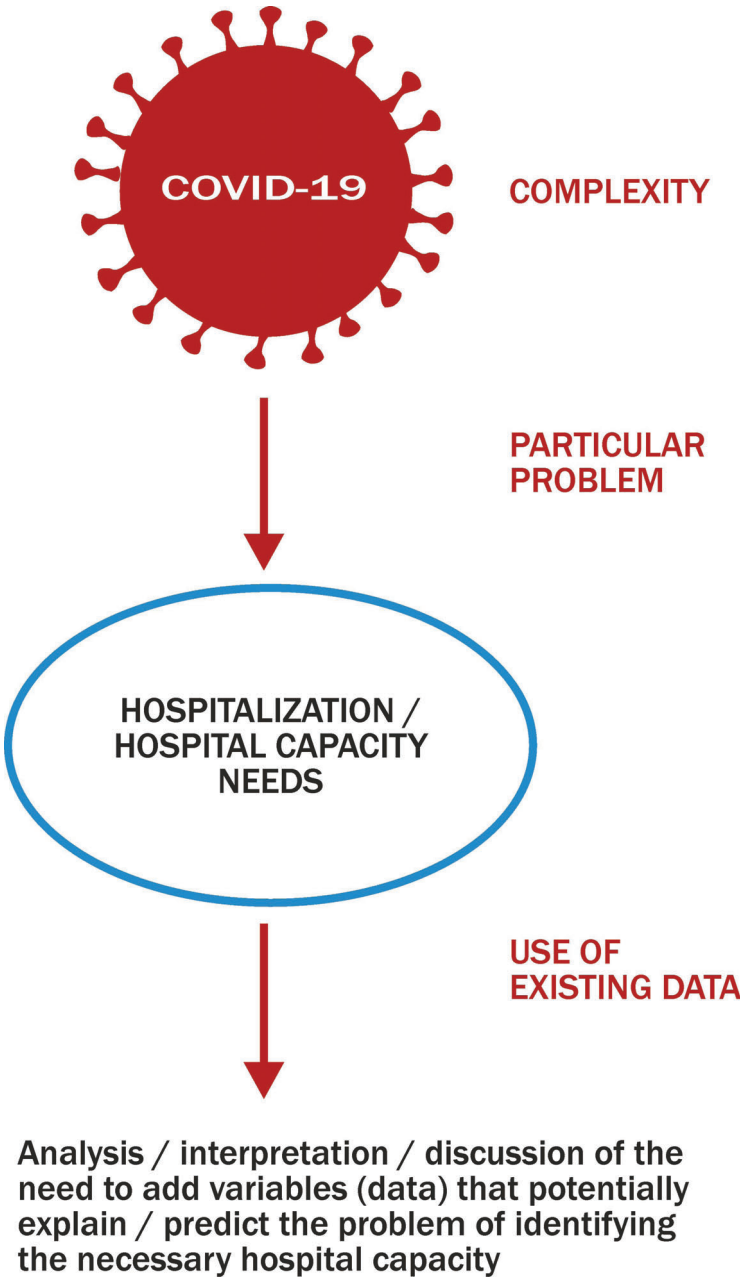

Figure 14. One example of the reduction of a complex phenomenon

The number of active cases potentially depends on:

1. Events (gatherings of many people)
2. Application and scope of epidemiological measures
3. Scope of testing in the population
4. Characteristics of the sample of persons being tested (reasons why they were tested)
5. Types of virus variants (contagious)
6. Population vaccinations
7. Awareness of health professionals and the population (reliability and consistency in information)
8. Knowledge of COVID-19 at epidemiological, clinical, biological level (professional and scientific achievements)
9. Population reactions to the introduction of epidemiological measures

Whether an infected person will be hospitalized or not - it probably depends on several things. Potentially, it depends on:

1. Clinical findings
2. Age of the person
3. Possible comorbidities and other risks
4. Types of virus variants (contagious, spreading...)
5. Hospital capacities at various levels (hospitals, additional spaces such as sports halls, tents, etc.)

In this case, the data selected by reducing the complex phenomenon did not provide an answer to the question of the need for hospital capacity.

Namely, there is no data on the clinical findings of the infected (perhaps they can be found later in the medical documentation, i.e., in the medical record of the hospitalized / non-hospitalized person), on the type of virus variant the person is infected with, there is no data on the characteristics of the sample. Likewise, other variables that potentially affect active cases are not available.

Figure 15. Evaluation scheme

Evaluation

The term “value” is more complex than we usually think. We often understand this term as a subjective expression of our desire, intention or need, but “value” can also be understood as something general, something related to health, truth, progress, etc.

The process of judging or “calculating” the quality, importance, quantity or value of something is called evaluation.

Evaluation of public health action, intervention or research is always a twofold problem: once, the evaluation deals with the whole picture meaning operationally, ethically and politically, and the second time it confronts concrete quantitative facts. Facts are quantitative and values are qualitative.

According to the phenomenological tradition, value is understood as a complex category of two components, the agent as the subject who carries out the intervention, reacts and decides, and the fact as the outcome of the intervention.

An agent is a social entity, person, or organization that can react and influence decision-making.

Our evaluation model is holistic in the sense that quantitative factual evaluation is linked to qualitative evaluation agent.

As a rule, the evaluator starts from a certain phenomenon and qualitative evaluation of the agent in that phenomenon, recognizes the different patterns that characterize it, and then, recognizing the possibilities of measurement, develops a quantitative evaluation of facts and outcomes of intervention.

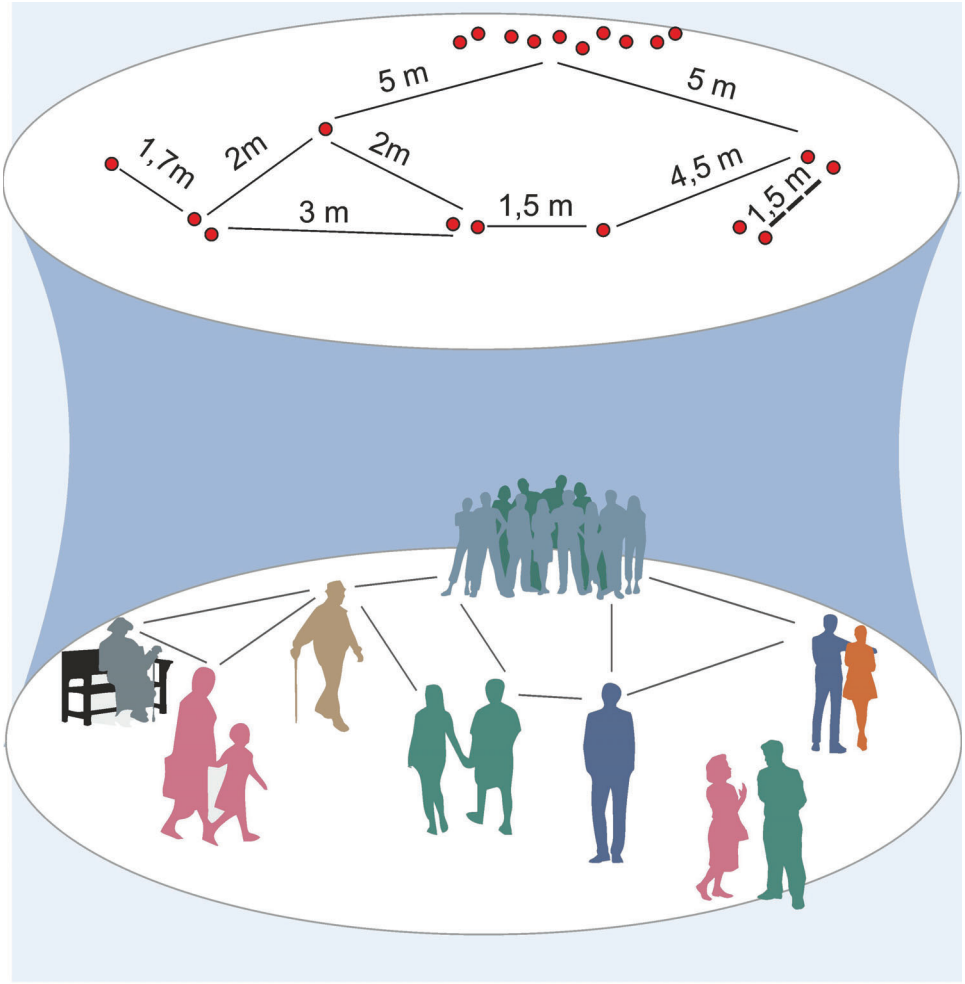

Figure 16. Quantification of touch space

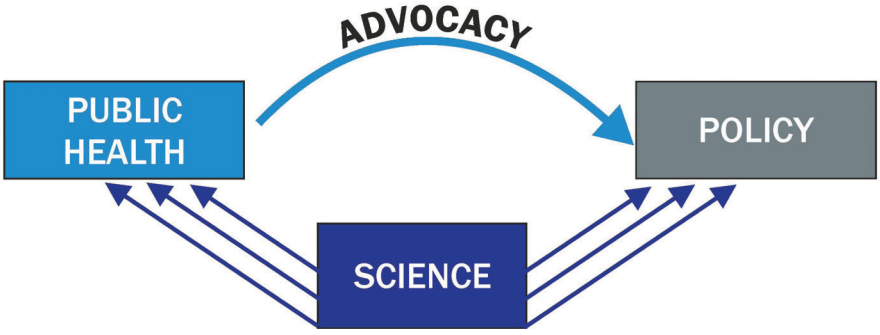

Figure 17. The key agents triad

Quantitative evaluation of facts

We articulate the evaluation process with three concepts:

- adaptive networking systems,
- agents of intervention processes that are intelligent, adaptable to changes in the system, with the power to decide and act,
- information channels between systems.

Evaluation is carried out from the very beginning in parallel with the intervention.

Example: How pandemic politics makes decisions

To evaluate the phenomenon (pandemic) of adaptive networking, we take the following: public health agents, science agents, citizens, and politicians.

According to the contents of their information channels, and their mutual connections, we evaluate:

- Science agents who provide specific information on the SARS CoV 2 virus, its infectivity and other characteristics, and on the development of vaccines for COVID-19. This activity often confuses the population, which requires a clear answer. Scientists' answers are not necessarily consistent,
- Public health agents who recommend epidemiological and organizational measures, sort out specific information on pandemics and vaccines, and transfer information to policy agents through advocacy,
- Policy agents who adopt a single (singular) policy on the dynamics and scope of implementation of measures and on vaccination.

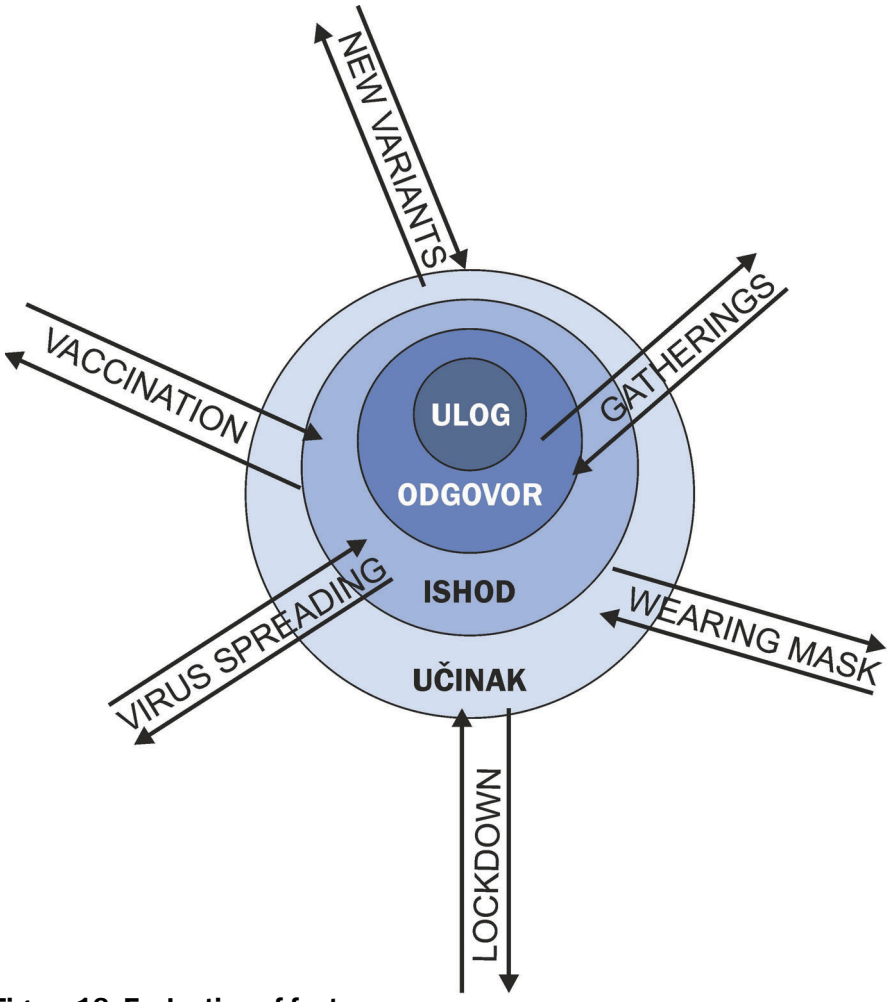

Figure 18. Evaluation of facts

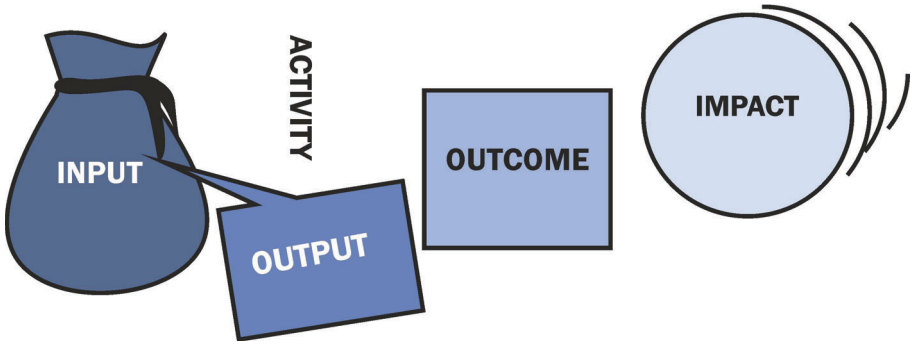

Figure 19. Evaluation process logic

The logic of the evaluation process

The theory and empiricism of qualitative analysis defines five categories of evaluation and evaluation as a process (OECD, 2010):

INPUT - Financial, human and material resources used to develop the intervention

ACTIVITIES - Measures or work taken to mobilize financial, human and material resources to produce a specific response,

OUTPUTS - Products, capital goods and services as a result of the intervention, and relevant to achieving the outcomes,

OUTCOMES - probable or achieved short- or medium-term effects of response to the intervention,

IMPACT - Positive and negative, primary and secondary long-term effects of intervention, directly or indirectly, intentionally or unintentionally.

Example: Vaccination as a phenomenon

Providing financial, human and material resources is the INPUT for implementation.

ACTIVITIES include vaccine procurement, organization and implementation of vaccination.

OUTPUTs consist of the dynamics of vaccine arrival, information and reaction of citizens and the health system to the vaccination action.

OUTCOMES represent the response and dynamics of response to vaccination.

IMPACT, ie the long-term effect, cannot yet be estimated. A potential measure of the effect of vaccination could be to stop the pandemic (in whole or in part, ie to reduce it to a seasonal phenomenon).

The most common practice is to analyze only the impact according to the input after the end of the intervention. Sometimes only the outcome is evaluated, because no impact is expected.

Figure 20. Agents' reflection on reality

Qualitative evaluation of agents

Identification of agents and participants is the first evaluation procedure. Agents differ from participants in that they have a more active role and influence in developing and solving problems. The agents of the COVID-19 pandemic have special interests because the success of the intervention depends on their behavior. According to the picture of adaptive networking, we distinguish between public health agents, science agents, politicians, citizens, and even the variants of the SARS CoV 2 virus can be understood as agents.

We evaluate two components: the agents´ action and the effect of action. Qualitative process evaluation is determination of value of public health action, program, research, policy, and intervention, including the COVID-19 pandemic. We are evaluating is the succession of events during the pandemic. We are looking for patterns. The methods we apply are common techniques of observing, interviewing and analyzing textual data and documents. We evaluate the value judgment about agent by reflection, that is, by reflective analysis. Reflective analysis and practice is the mental process of questioning the re-experience of what has already been done. This is achieved by a special interview technique, with standard blocks of questions:

1. Identify a situation you have encountered in your business or personal life that you believed could have been resolved more effectively.

2. What happened? When and where did the situation happen? Any other thoughts on that situation.

3. How did you behave? What were you thinking? How did you feel? Are there other factors that influenced the situation? What did you learn from that experience?

4. How did the experience match your preconceived ideas, or was the outcome expected or unexpected? Does that apply to any formal theories you know of? What behavior do you think could have changed the outcome?

5. Is there anything you could do or say to change the outcomes? What actions can you take to change similar reactions in the future?

What different behavior would be possible?

6. Reflective interviewing is prepared very studiously and is conducted in dialogue with the agent. There is a version that the agent himself makes self-reflection on his actions and achievements.

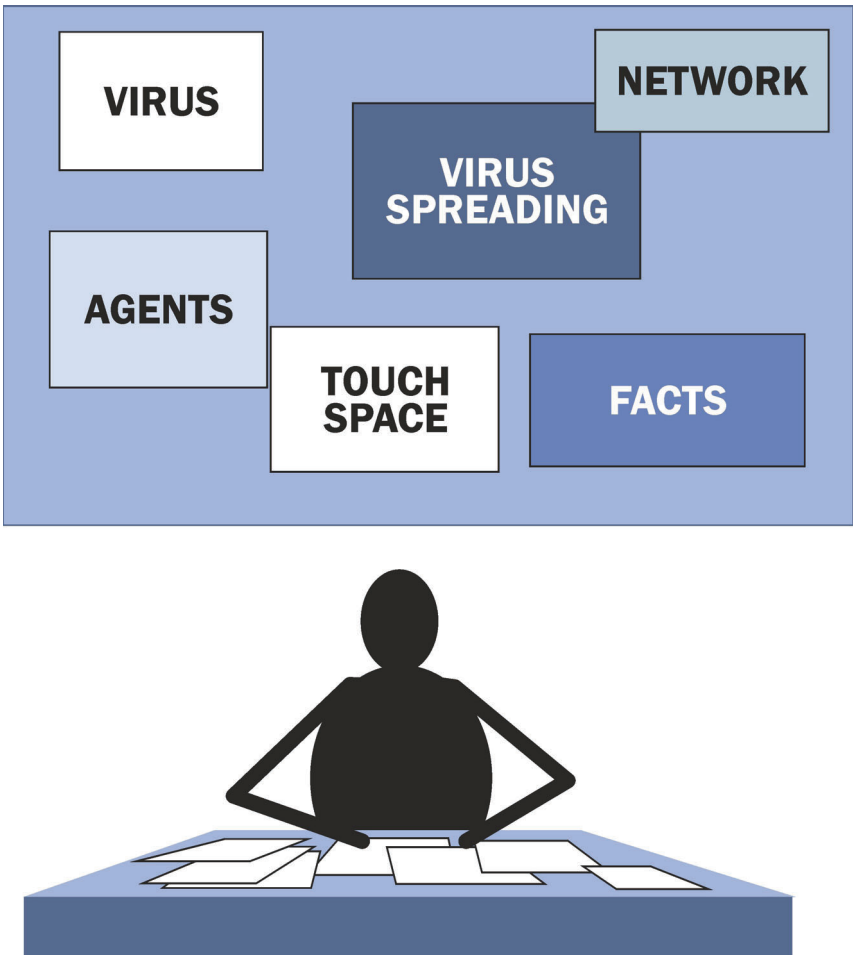

Figure 21. Evaluation of the phenomenon

Understanding evaluation

Evaluation of facts

In the events related to the COVID-19 pandemic, agent systems are being developed:

- New dynamic system of public health agents (headquarters)
- Social system of citizens
- System of policy agents (policy direction)
- SARS-CoV-2 system

These four systems develop adaptive networking of the COVID-19 system, which is dominated by the communication and information channel of public health agents with the population. Through this channel, epidemiological and public health measures are directed towards citizens, in which acceptance and opposition to epidemiological and other measures are developed.

The facts about the Sars-CoV-2 virus related to its contagiousness, virulence, mode of transmission, etc. are provided by science.

Facts about public health agents are the selection and suggestion of public health measures (wearing a mask, hand disinfection, organization of health services, e.g., establishment of COVID-hospital and new deployment of health workers in the health system, etc.).

The social system of citizens reflects the behavior of citizens according to prescribed measures (anti-vaxers, anti-maskers, citizens who accept prescribed measures, etc.).

Policy orientation in accordance with public health measures refers to “closure”, “opening”, easing and tightening of measures related to various activities (online schools, closure of gyms, restaurants, etc.)

The evaluation of facts is directed towards three relations between the categories of evaluation:

- Input - output
- Input - outcome
- Input – impact

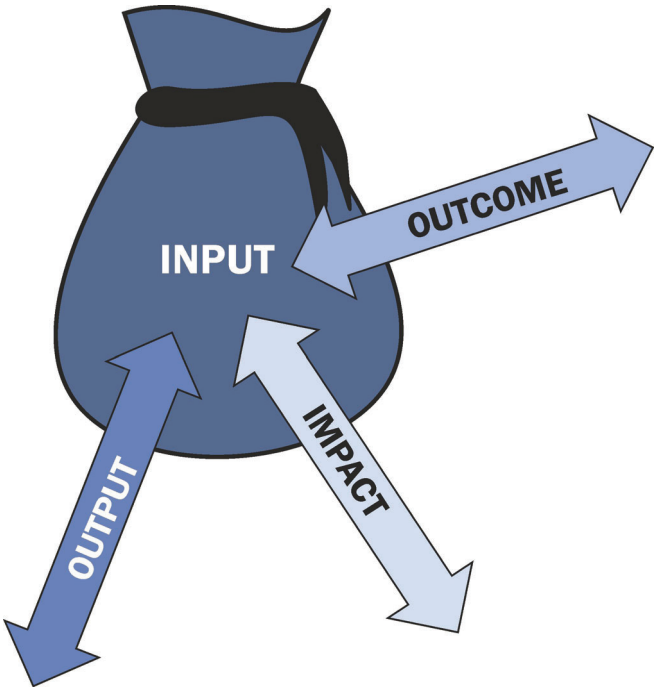

Figure 22. Three relations according to input

Input, outcome, and impact reflect facts that are concrete, quantitative values.

The first evaluates the commissioning of the intervention plan, the second the outcomes of early and late changes in the acceptance of intervention measures, and the third, the effect, definitive changes in intervention measures (vaccinations, protective measures).

A pandemic should be viewed in a broad class of nonlinear phenomena, as one small disturbance of the system can cause a disproportionate, exponential systemic response.

Unfortunately, since people are not accustomed to nonlinear thinking, they are likely to follow an inappropriate pattern where small variation is expected to cause small differences in outcomes and vice versa, while disproportionate, unexpected, long-term effects are ignored.

Linear thinking in nonlinear situations makes learning difficult, especially where nonlinear causality involves feedback loops, delays, and dynamic behaviors (Sterman, 2002). When X causes Y, we also need to consider the impact of Y on X, i.e. adaptive responses of systems and individuals based on performance feedback loops (Gavetti, 2012).

Namely, in nonlinear phenomena, we do not have the relation "1: 1", but the relation "n: m". It is wrong, for example, to conclude that not-lockdown is directly responsible for increasing mortality in the COVID-19 pandemic because it is not a "1: 1" causality but a "n: m".

Complex intervention theory is based on a realistic idea of causality that considers the interaction between the expected mechanism and its context in order to produce certain outcomes (Pawson, 2006; Sanderson, 2000).

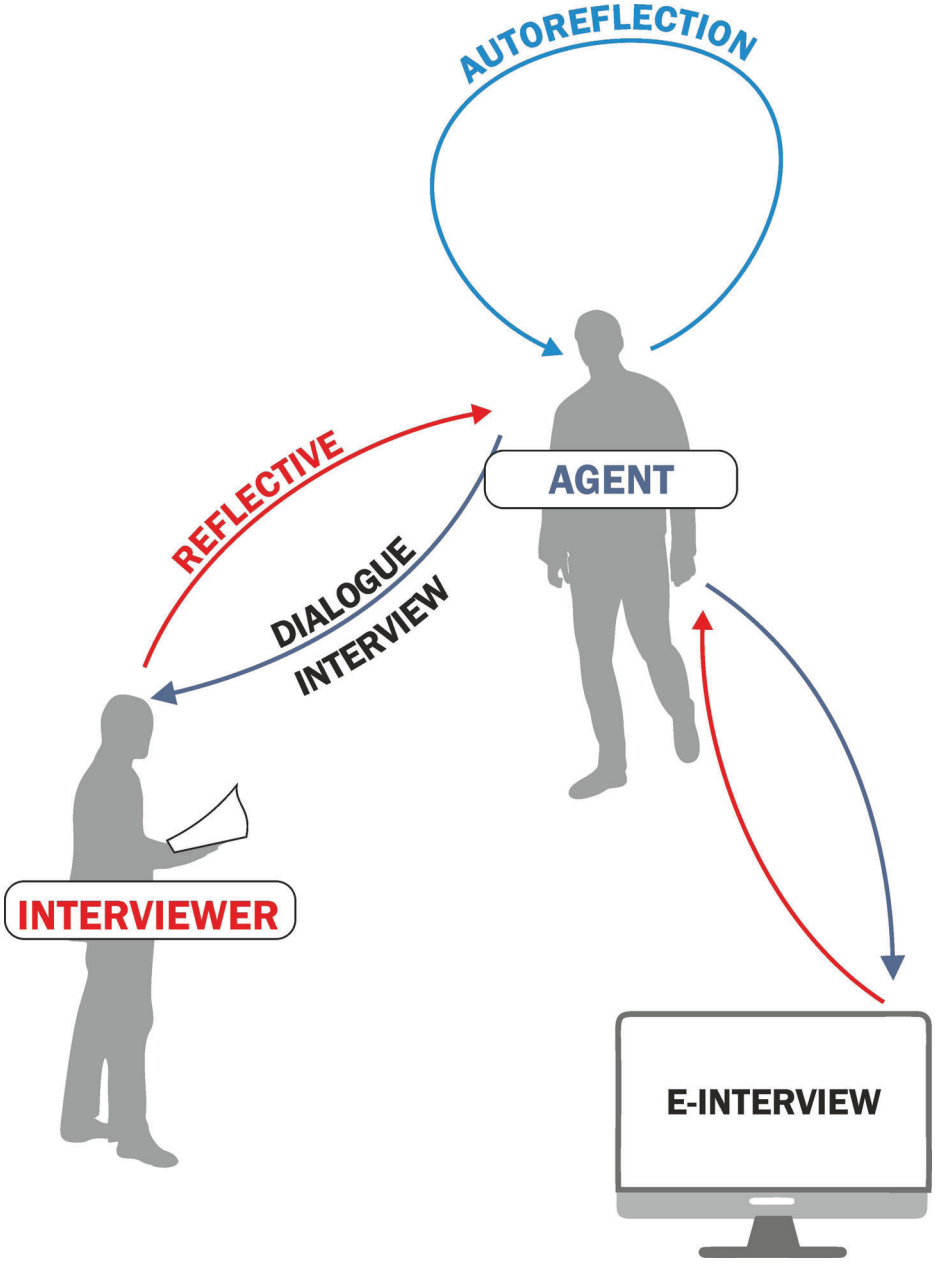

Figure 23. Reflection techniques

Evaluation of agent activities

Evaluation of facts (output, outcome, impact) is, by its nature, quantitative and can be expressed in indicators and estimates.

The evaluation of the agent's activity is qualitative. Evaluation of agent activity is a cognitive process. To assess the value of an agent, we strive to put the agent in a reflective state. It is a complex process; it requires professionalism and studiousness.

To put someone in a reflective state, we have these cognitive techniques:

1. **Self-reflection**. Self-reflection requires psychic activity, focusing attention on one's own experiences, thoughts, judgments, and reflections on oneself and one's intervention and life experience. Self-reflection is the talent of questioning oneself. It's a good method of estimating the value of something. The agent's comparative reflections require specific methods.
2. **Reflective interview.** The interviewer dialogically encourages the agent to reflect.
3. **Electronic interactive interview.** It is conducted in cases where it is not possible to arrange an interview. Electronic interviews are not the best solution.

We understand the reflection as the agent's image of himself and his experience of the COVID-19 pandemic. That is the value of the actor. It is important to note that the overall picture of the COVID-19 pandemic includes both the object itself and the agent that creates that picture.

The essence of the reflection was described by Bohm (2009) as follows:

What appears to us as a representation will not be the same as the thing itself - it is a very abstract or general form. In other words, the representation is united with the presentation so that what is presented is already a representation, that is, it is presented again. We get what we might call the final representation, that is, the result of thought and feeling.

In short, reflection is the survival of a reality again.

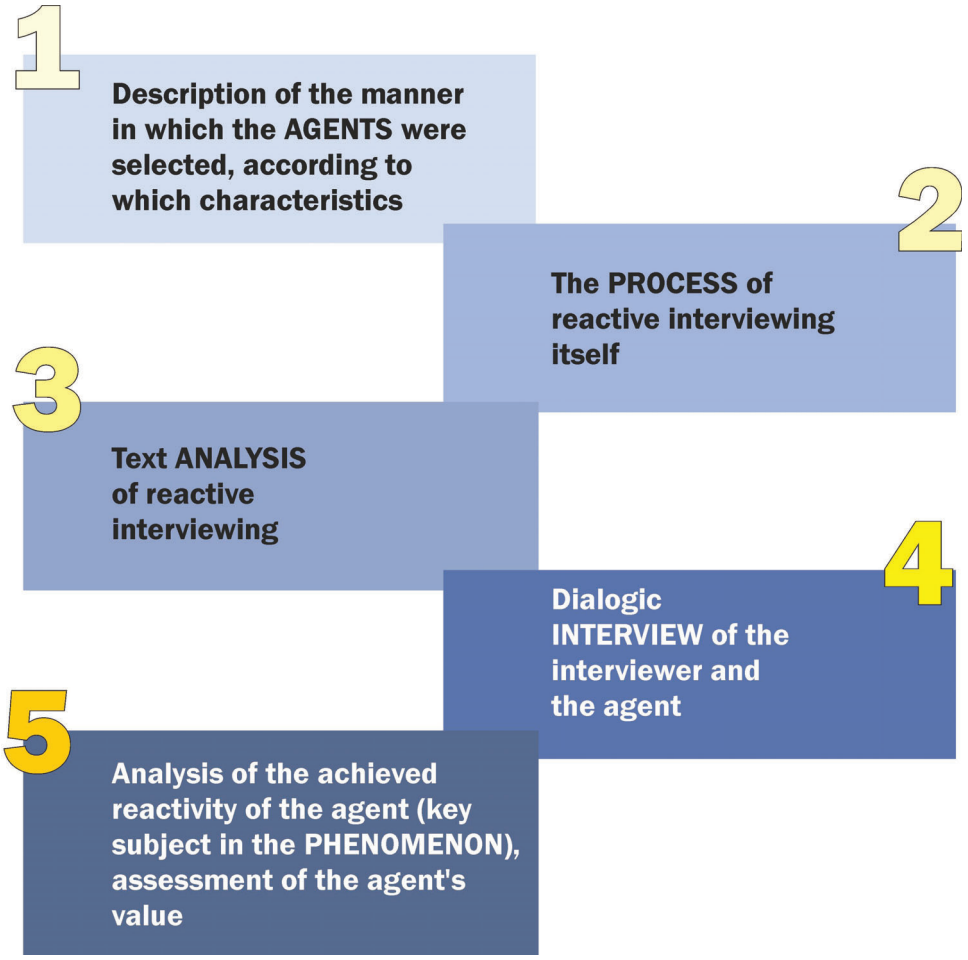

Figure 24. Timeline of the evaluation process

Timeline of the evaluation process

Notes:

1. **The evaluator and his team conduct an evaluation of the intervention, independent of the team conducting the intervention.**
2. **Evaluation is organized from the very beginning of the intervention, and all events that develop during the phenomenon are continuously evaluated.**
3. **Evaluation is conducted in a dialogical-educational way, not criticism**
4. **The evaluation team is multiprofessional.**

The first phase of the evaluation is to identify the systems and their agents and describe the communication channels:

- In the example of the COVID-19 phenomenon, one communication channel is communication between agents of the public health system and the public, where COVID-19 infection is transmitted through the touch space.

Communication between public health system agents and the public is a key channel of the adaptive network.

- In this phase, one should evaluate what is sent through communication channels, evaluate feedback, positivity / negativity, evaluate the self-organization of the phenomenon, what the attractors are and the tendency of the system to order-disorder-chaos-order.
- Special attention should be paid to non-linearity, because through non-linearity we identify all opposition of citizens to epidemiological and other actions of public health agents.
- A pattern needs to be identified in the communications of public health agents with citizens, science and policy agents. It is the core of an adaptive network.
- In particular, the SARS-CoV-2 agent system should be evaluated, which means identifying virus variants with the consequences of a pandemic spread.
- The following is an assessment of the three categories of evaluation: input-output, input-outcome, and input-impact. The indicators of structure, intensity and prediction should then be assessed.

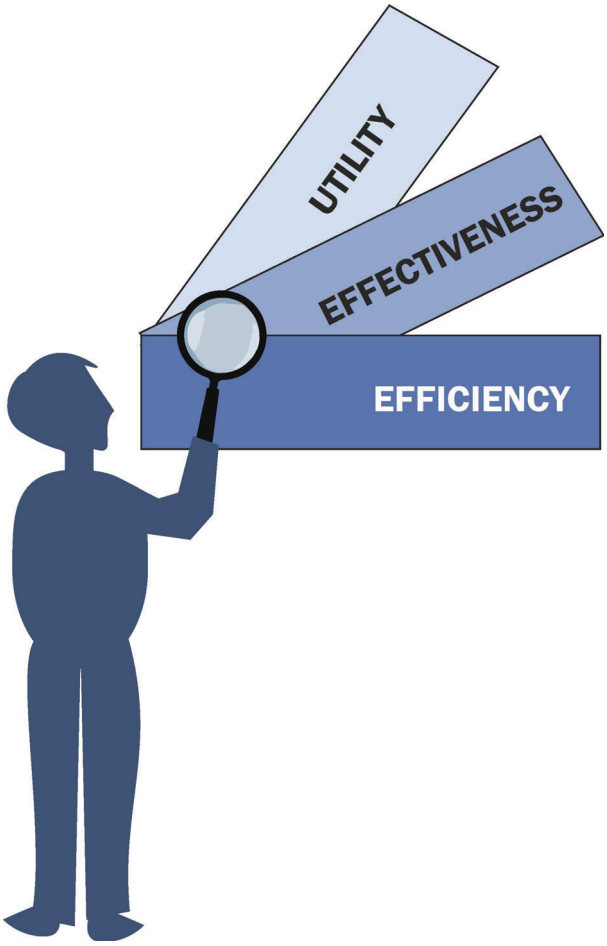

Figure 25. Three evaluation parameters

- The identification of the adaptive network is followed by the identification and description of the contact area. It is then necessary to assess the way the infection is transmitted in the area of contact, and the awareness / unconsciousness of the behavior of citizens.

The second phase of the evaluation includes the evaluation of the agent, primarily the agent of the public health system, and secondarily the other agents in the COVID-19 pandemic.

The evaluation is carried out in several steps:

1. Description of how agents are selected, by what characteristics
2. The reactive interviewing process itself
3. Textual analysis of the transcript of the interview
4. Dialogic interviewer and agent dialogue.
5. Analysis of how and to what extent the reflectivity of the agent has been achieved as a key phenomenon in the assessment of the agent's value.

At the end of the evaluation program, the evaluator evaluates three parameters of the success of the intervention:

1. Effectiveness

a. whether the objectives of the program have been achieved - if yes, why yes, if not, why not,

2. Efficiency

a. assessment of whether the program input was realized in output, outcome, impact - if yes, why yes, if not, why not.

3. Efficacy

a. whether the funds invested, material and mental, justify the objectives achieved by the program

b. whether the initiative of the intervention program was worth the expectation.

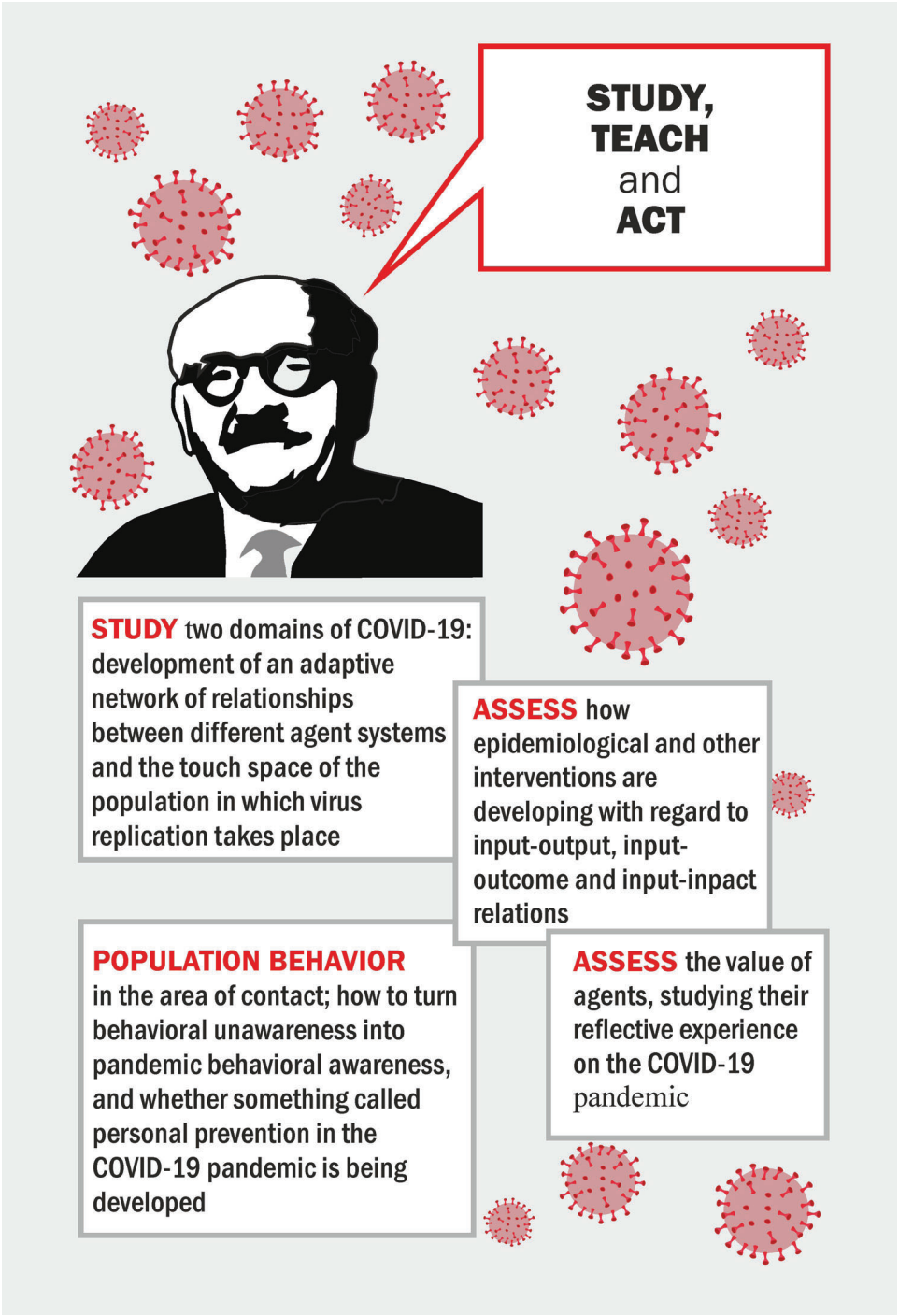

Figure 26. Principles of Andrija Štampar

Epilogue

In the practice of our public health, evaluation is relatively neglected. It is not mandatory, it is more of a spontaneous activity. It is often a separate process but dependent on the intervention process.

Evaluation must be an independent dialogical activity that is developed from the very beginning and carried out completely independently of any intervention process. Every public health activity is primarily a subjective, qualitative activity.

Only after we have qualitatively described a given phenomenon as complexity, a phenomenon that is perceived as a nonlinear phenomenon, do we reduce it to a linear quantitative phenomenon. Every evaluation is first ideographic and qualitative, and only when we recognize and identify the pattern of a given phenomenon, then from nonlinear thinking and reasoning, we move to quantitative nosological, causal reasoning.

There are not only quantitative or qualitative models of analysis. They merge and coordinate. When we need to understand and comprehend something, we use the power of expression, and when we need to prove something, we dedicate ourselves to measurements, numbers on different interval scales.

Any research is complex, and when a scientist gets involved in research, then complex becomes complicated.

The evaluation strategy follows 100-year-old Štampar's idea: people should be studied and then taught. In modern language, in the case of the COVID-19 pandemic, we express it as follows:

1. Study two domains of COVID-19: the development of an adaptive network of relationships between agent systems, and the touch space of the population in which virus replication takes place.

2. Then assess how all epidemiological and other interventions are developing with regard to relations, input-output, input-outcome, input-impact.

3. Behavior of the population in the touch space: how to turn unconsciousness into awareness of behavior towards a pandemic, and whether something that would be called personal prevention in the COVID-19 pandemic is being developed.

4. Assess the value of agents by studying their reflective experience in the COVID-19 pandemic.

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Phenomenology in the practice of the COVID-19 pandemic

Interviewing

Kn creating the pages of this handbook, we are constantly questioning our own intentions and goals that we want to achieve. Is this a practical handbook, who will (and will anyone) use it in their work or is this just another theoretical approach that seeks to improve the daily work of a public health actor? Are these clear guidelines that will encourage public health workers to apply reflective analysis? What is phenomenology and how to apply reflective analysis in your work? What are the benefits of such an approach and how easy is it to apply?

In our effort to explain as simply as possible what we are talking about, we are continuously conducting a reflective analysis of ourselves. We talk a lot and question the purpose of our work, our role in the process of creating this book and what we want to achieve with it. We think about what we do successfully and what we fail at, so we change concepts accordingly. Applying reflective analysis just sounds complicated, but in fact it is a very simple approach. Reflective analysis is part of phenomenological practice, and phenomenology is a philosophical field. It doesn't sound easy and here we see potential resistance in using this approach. Philosophy in public health?

Why is that at all?

The fact is that public health is above all a multidisciplinary and interdisciplinary activity. Public health processes include all dimensions of social processes - political, economic, economic. The approach to the study of public health challenges should be both quantitative and qualitative, one should not exclude the other. However, in the study of public health processes, the scientific community is currently dominated by a quantitative approach, while the qualitative one, which is part of the phenomenological approach, is neglected.

Why a qualitative approach in the study of public health events is so important to us can be seen precisely on the example of the COVID-19 pandemic and the problem of vaccination in Croatia. We currently have a problem of low vaccination coverage of the population, and as public health workers we aim to achieve a high vaccination rate, so we are carrying out certain interventions accordingly. Emotions that are mostly created in a public health worker who aims to achieve a high vaccination rate are anger, feelings of helplessness and burnout from hard work in managing a pandemic, and one of the main results is

clearly lacking. Movements are increasingly forming within the population that are resisting current measures to prevent the spread of the infection, and many of them refuse to receive the vaccine. At the moment, there is a polarization in society between those "for" and "against". We, as public health professionals, should view this phenomenon as a social fact, as something that is obviously happening, get rid of negative emotions and, above all, approach the problem from the point of view of the following questions: what exactly is happening and why is it happening? Who are the people who are resisting vaccination? How are they living? What are they afraid of? And you should ask yourself a lot of other questions, and then definitely ask them the same questions. We need to ask ourselves what we are doing successfully and what we are failing. We need to ask ourselves what we do successfully and what we fail at. What are our expectations and according to what type of population do we have certain expectations. What have we done so far and what have we not and what else could we do? When we get the answers to these questions, we will be able to create a much more successful intervention, because we will have a wealth of information that we did not know until now. We may find that the part of the population that refuses to receive the vaccine is not the anti-vaccine population but cultivates certain emotions and fears to which we can respond and intervene appropriately.

It is on this track that we conducted a reflective analysis with three very important agents in pandemic management in the city of Zagreb. We wanted to find out how they see the process of analyzing their own actions and give them a retrospective insight into the activities they have been carrying out since the beginning of the pandemic. The first round of interviews was conducted in June 2021, and the second part in November and December of the same year. It is important to emphasize that we tried to remove any judgments related to their profession, but directed them to remember the events as they are and their actions exactly as it was, regardless of whether it was "correct" or not. There is no right or wrong in the phenomenological approach, but the emphasis is on the very essence of things. What happened is fine, how the agent felt is fine just the way it was. The only thing that mattered to us was their lived experience, with as few cognitive biases as possible. Accordingly, we created reflective interview questions. In addition to the above, we conducted an interview with one citizen to gain insight into the reflection "on the other side", from a person who is not a health worker and is not in any way involved in the management of the pandemic. The following is a detailed procedure for conducting a reflective analysis of actors in the COVID-19 pandemic.

Creating questions to conduct a reflexive interview

We created questions for public health professionals based on the Gibbs and Borton model (Vuletić, Kern, 2020):

1. How did you enter your role in the pandemic? How did everything start?
2. What were you doing during the pandemic? How were you feeling?
3. What is the importance of this act?
4. What was the essence of your action in the pandemic?
5. What happened during the time of the pandemic?
6. What has been successful and what has proved unsuccessful?
7. Why was this necessary?
8. Have you experienced anything beautiful / ugly?
9. What more needs to be done?
10. What are the expected consequences?
11. What are your expectations regarding the pandemic?

We have created questions for citizens as follows:

1. How did you experience a pandemic last February?
2. What did you notice in the behavior of other people?
3. During the first wave, until the beginning of the summer of 2020, what did the pandemic bring good and what bad?
4. Were there ugly, but also beautiful moments?
5. Later, when the pandemic erupted, what did the people do and what did the health service do?
6. What was positive in such situations and what was negative?
7. What went well in the new phase of the pandemic and what did not go so well?
8. What do you think about citizens' opposition to health service interventions?
9. How could health service interventions be made more acceptable citizens?
10. If you were faced with the same situation again, what would you do differently?

11. What types of skills need to be developed to better cope with this type of situation?

Conducting interviews - an example of qualitative evaluation of agents in the complex phenomenon of COVID-19

The aim of the reflective interviews was to investigate the lived experience of four agents of the COVID-19 pandemic phenomenon, three professionals and one citizen.

During the interview, we tried to direct the agents as little as possible to professional conclusions, but to emphasize the importance of personal experience.

What else do you need to pay attention to? There are two basic approaches to evaluation:

- *participatory approach with active participation of the agent in a certain phenomenon,*
- *a non-participatory approach in which the researcher acts independently or within his / her research group.*

We **evaluate the facts** by applying standard quantitative models, ie by estimating four parameters: Input, Output, Outcome and Impact. Evaluation of facts does NOT imply a participatory approach (non-participation as the main characteristic). According to his idea, the researcher defines what he will measure, formulates surveys and questionnaires that include data. The analyzes it conducts are the basis for causal relationships.

Evaluating the agent of the phenomenon implies a participatory approach, which means that data on the phenomenon and the agents themselves are collected through open interviews in which the agent himself provides information. The technique of gathering information is reflective, whereby the interviewer with the prepared questions introduces the agent to the reflection on the phenomenon (agent participation as the main characteristic).

It should be emphasized that in phenomenological reflective interviews, the interviewer is not a passive examiner, but participates in the research together with the agent (whom he / she is interviewing) (he / she is also a researcher).

Reflection is the perception and experience of the COVID-19 pandemic that we call lived experince (Frechette et al. 2020): Experience is defined as personal knowledge of the world by direct first-hand involvement in everyday events, not by representing and building other people.

Interview analysis

During the fourth wave of the COVID-19 pandemic, at a time of strong citizen protests against vaccination policy, we interviewed four actors: Agent A (epidemiologist and scientist), Agent B (public health professional), Agent C (clinician and politician in office) and Agent D (citizen). The following text shows parts of the original texts of the agents' interviews and the tables show examples of textual analysis.

An example of a textual analysis of the experience gained in relation to COVID-19

Recognition of micro-terms and categories in the text of the interview

Agent A

Parts of the text from the interview	Micro-terms
1. We started with a digital assistant and through a few I presented it at a government press conference last week that platform	Directly, adrenaline-fueled stressful involvement in Covid-19 (1-4)
2. Some kind of adrenaline... I watched what was happening, what was being done in Singapore and South Korea	Politicization, "hates", aggravated dialogue with politics (8, 9, 10)
3. Society felt that something was happening (anxiety and panic during the COVID-19 crisis in Lombardy)	Social feeling, nursing homes (10)
4. Suddenly I just found myself somewhere, unexpected	Bipolar towards politics and the public (13, 14, 15, 26, 28)
5. It was felt and transmitted in the society, and there was an excitement and a need for action	Political engagement (22)
6. And we were wrong, and in everything we did I felt I was giving something, and it kept me ... it was very important to me, not to just complain that something should not be done, because it is always easy to be a critic	Incoherence of officials towards epidemiological measures (10)
7. I knew exactly what I needed to do: build a team, and everything else I teach my students, train people ... it was happening in practice now	Criticism and autocriticism (6, 7, 11)
8. That pressure around the public and later, which was politicized, then various "hates" started, so it was something that came to me unexpectedly	Non-compliance with epidemiological measures (10, 13)
9. One of the most important things was: not to allow some people to surrender to the "forces of nature" ... to prevent death	Political culture (12)

10. The number of infected and the number of hospitalized is growing, and we are organizing a “march of remembrance” in Vukovar, and we are still convinced that this is fine	Vaccination (14-16)
11. We don’t have “I made a mistake” because that means you have to resign immediately	Particularity of science (12, 13)
12. In our society, it is like this: if it is absolutely clear that you made a mistake, you will swear that you did not, that it was all supposed to be like that.... I don’t know when someone said “ok, that was wrong, let’s move on, and that’s it”	Neglecting of health and social workers (19, 20)
13. It is clear to me that someone in power must take care of that, of staying in power	Successful communication (23-25)
14. The vaccine is effective, the vaccine can be adapted to a new variant of the virus, only additional vaccination will be needed	Preferring digitalization in the future (26, 27)
15. In countries where “top” has shown consistency, importance, there is a much higher response to vaccination.	
16. Incoherence of officials, lower response to vaccinations	
17. When things are constantly relativized - maybe it is, maybe it is not - an attempt is made to make scientists, as in parliament, a parliamentary debate, that you have equal views, which is not the case here, science does not work that way	
18. What we need to do next is do some serological research to see how long immunity lasts	
19. They worked in abnormal conditions ... I don’t know if they got any care for their mental health. These people are exhausted, tired ...	
20. I think the people who worked are forgotten. So, people are in PTSD in nursing homes and hospitals.	
21. It was a nice feeling to contribute to such a crisis, with all the difficulties ... and I would be extremely frustrated that, with what I know and what I can, I could not do it	
22. I was - and I must say - in a specific situation - I am on the Government Council and I am a member of the opposition party	
23. How much I refused to be a guest in Dnevnik... Now I have received invitations to lecture in some other circles, for some other socio-political engagements	
24. That visibility in the media has brought me a benefit, for now	

25. I talked directly with my colleagues from Wuhan... Well, that someone told me a year ago that I will study now... Now not to mention... ZOOM, Meeting, Teams... whatever	
26. Working from home is a great thing for me that will continue	
27. Yes - we are more connected	

Category - VALUE
Emotional aspect: Empathy towards the elderly, and health and social workers; satisfaction with their professional work
Hierarchical aspect: Profession (epidemiology) in the first place, inconsistency of policy in respecting the recommendations of the profession
Cognitive aspect: Rational insistence on professional and scientific aspects, critical and ideological attitude towards politics and society

Agent B

Parts of the text from the interview	Micro-terms
1. Aware of what awaits us, we immediately began to prepare both epidemiology and microbiology, sought the consent of the Ministry ... early detection, hotspots	At the beginning of the epidemic, full readiness immediately (1-3)
2. We decided at the beginning of April to start with our drive-in, which, in some people, even caused ridicule. However, it has proven to be an example of best practice	Stress Management (4, 5)
3. In the meantime, we procured equipment that was almost impossible to get to, it was abnormally difficult conditions, that is, the prices went wild, everything skyrocketed, not just protective equipment.	Care for citizens (6)
4. Well, it's all very stressful. Huge stress because you really want to do your best	Pride in one's work and institution (7, 9, 11, 18)
5. We should not have allowed ourselves the slightest mistake, terribly great stress, to get everything together on time	Youth mobilization (7)
6. There was a crowd here with a huge number of returnees who, without a negative PCR test, could not return to the country where they live and work	Appropriate organization (8, 14, 15, 16)
7. We had to mobilize everything... which is equally important, that we then employed about 50 students	Modern management (10,11)
8. The fair proved to be a really perfect solution (organization of vaccinations at the Fair)	Fatigue and burnout (12-14)
9. I think we did everything great and wouldn't change anything	Obligation of epidemic measures (18-21)

10. You have to be “cool” ... this is one of the basic postulates of modern management, that you must always tell the truth, whatever it may be, that everything you say must be short, clear and understandable to all	
11 And emotional intelligence which is a condicio sine qua non of modern management	
12. 24-hour availability	
13. One thing upset me terribly. At one point there was an inscription almost that we are COVID profiteers. It’s something too scary. It is an elementary ignorance of the work... we who work... microbiology has not had a day off, and it does not exist today. People worked on Saturdays, Sundays, holidays, in shifts of 17 hours	
14. Our epidemiologists, who were even COVID positive, were at home and telephoned, worked ... so ... it’s something one can’t forget, something I’m extremely proud of	
15. For that not to happen this year, one should be smarter, one should be more moderate. Of course, it’s hard to always find a balance between health and the economy, you have to eat	
16. In percentage terms, we succeeded the most in Zagreb, we spent the most doses from AstraZeneca, and we succeeded only with quality communication with people. And we didn’t settle down. And all the time we were saying what is true, and that is: to protect against a severe form of the disease	
17. The question is, what awaits us from autumn, but I think that at this time the one who needs to deal with it should deal with it.	
18. I will remind you when there was an epidemic of smallpox, which have a fairly high mortality rate, that then no one asked whether or not you want to be vaccinated, everyone had to	
19. The question here is how many people died at home without being aware that the Corona brought it to them, therefore ... if we know how many people died, and we know how long it took in Zagreb to bury your loved ones, then I think that what anti-vaccines are doing is all but not good for this society.	
20. There are different reasons. One is that they read in the media various articles written by journalists who are not educated at all, the other reason is that you have problems with people who are really problematic. You have sick people who really have serious mental illnesses, you have had some doctors for a long time who are anti-vaxers for reasons unknown to me..	

21. I will remind you of the situation in Dubrovnik, where the vaccination coverage of children was the lowest. Our epidemiologists went to help vaccinate children when parents realized what they were getting into (the measles vaccination case). They suddenly realized what danger lurks for their children because of their decision, because children do not have the right to vote. They don't even know.	

Category - VALUE
Emotional aspect: Towards citizens, own institution, emotional intelligence
Hierarchical aspect: Modern management
Cognitive aspect: Professionalism in public health

Agent C

Parts of the text from the interview	Micro-terms
1. Faced with completely new events, new frameworks, new behaviors, a new world is created without restrictions	COVID-19, new world, new behaviors, organization, new patterns, on front line (1, 2, 7)
2. We had to organize in a way that we implement new patterns to make it effective and efficient	Stress shortage of material resources (3-7)
3. Lack of strategic equipment, we borrowed equipment from health centers	Strategic defense concept, comprehensive (3, 9, 10, 12, 13, 14, 15)
4. Procurement of equipment was a particularly stressful event	Neuroticism of health workers (11, 26)
5. That strategic material - protective equipment, that whole business, that whole engagement of the team that was around me, about 7 people, looked like a stock market. Everyone came with the information "here we have this, here we have that", prices were changing at breakneck speed	Intuitive team engagement (5, 16, 17, 19, 20, 23)
6. We tried to hire a plane, we hired people who could do it, but the attempt to realize that project failed very quickly because the Americans simply took that equipment for their own needs.	Criticisms, accusations, that we went beyond the framework (18, 30)
7. Very traumatic and very, I would say, dynamic performance of these tasks so that our institutions could function on the front line, so to speak - the battlefield, because the whole event was impressive as a war	Positive human awareness (21, 22, 28, 31)

8. After the breakthrough into nursing homes the system fell apart	The arrogant ego of man (29,31)
9. Changing the strategy for social institutions	The new face of healthcare (24, 25)
10. Have an insight into social institutions, what is happening	Mutation viruses (23)
11. COVID has neurotized family doctors	Organization changes (38, 41)
12. Strategic concept of defense from COVID, a lot of discussions, doubts about how to set it up	Manufacture of masks, etc. (27)
13. KB Dubrava transformed into the COVID hospital	Empathy for the man affected by COVID and the earthquake (49)
14. Heritage of Štampar, infrastructure of the Teaching Institute for Public Health "Dr. Andrija Štampar ", a good public health platform	Unwillingness to crisis situation with COVID (8, 35, 36, 38)
15. Capacities of just below average, expectations from China	Adapting to new conditions (36, 37, 45, 46, 47)
16. We shared everything, helped each other, embodied solidarity, the strength of the unity of collectivism	Positive legacy of public health system infrastructure (39)
17. Resolve intuitively, by engaging a variety of profiles	Cooperation, solidarity, collectivism in action (40)
18. Lots of criticism, that we went beyond the dimensions.	Coping with a new situation (32, 34, 41, 42, 47)
19. Lots of improvisation from moment to moment, from intuitive to rational, through counseling	Side effects of COVID (43, 44, 47, 48)
20. And if we had just a little joy, we thought we were in control of something, then something would happen somewhere again, some miracle, some breakthrough, and then it would bring us back again, destroy that some optimism we nurtured ... then it would open a hotbed again	The power of feeling (42, 49, 50)
21. Positively, that every man became aware, suppressed arrogance, some individuality of the divine level	Optimism (51)
22. Man returns to introspection, to some awareness	Criticism (30, 50)
23. Changing the structure of the virus, we are in an intermediate phase	Philosophical humanism... fatalism (52)
24. Infectious diseases, new face and reverse	
25. At one point, in the healthcare system alone, we had over 500-600 people "out of the system"	
26. I am also on duty in surgery	

27. The community began to produce masks	
28. Personally, I am satisfied with everything that has been done, the experience of perseverance, we have learned a lot	
29. A man often forgets another of his faces, that he is a man	
30. The most difficult thing for me was some critical reviews that went beyond the scope of some correctness	
31. Man has no alternative, ego - it is a complete failure, you just have to make it aware	
32. We have immediate, therefore, real consequences, so we have medium and late consequences, we will see	
33. I think we will learn a lot	
34. There is a space for the entry of informatics and these technologies for life	
35. Faced with a completely new event... we had to organize ourselves in such a way as to implement these new patterns, to make it effective, efficient	
36. That part of the procurement of equipment was particularly stressful because everything that was agreed today was not valid tomorrow.... we tried to hire a plane, we hired people who could do it, but the attempt to realize that project failed very quickly because the Americans simply took that equipment	
37. Very quickly we made certain decisions about hiring hospitals,... we had to change our strategy to strengthen homes for the elderly and social institutions	
38. Functioning through COVID clinics and contact with such patients in general, I would say, neurotized a lot of primary care physicians and all of us, so it took people a long time to transform	
39. Encouraging, ... I have always considered and attributed this to the existence of a good legacy of Andrija Štampar's teachings, a good legacy of the infrastructure we brought, as well as health centers and Teaching institutes that we had... all that actually makes this platform for public health...	
40. The beginnings were, I would say, an embodiment of the solidarity that existed, and they showed that strength of togetherness, collectivism and how much we are committed to each other	
41. By hiring people of different profiles... you have to improvise a lot of things from moment to moment... intuitively	

42. Adrenaline works its way	
43. The individual became aware of, and then suppressed, arrogance through it... communication with family members became safer and more intense	
44. Such stressful events have done a lot of damage to certain profiles, certain businesses, certain families	
45. Much more complicated and difficult, however, algorithms and patterns have been developed on how to care for and treat such patients in general, and we very quickly found that framework.	
46. A bird has two wings, so society must have, and the economy must have private and social sectors. Privatization, deregulation and cutting the public sector has become a global mantra, I think we need to rethink this thesis	
47. Brand new industries have opened up, so to speak, we have started to produce masks quickly, our tailors have started to produce masks, designers have started to design, so, I would say, a new way of life has developed, which suits the emergence and epidemic calls COVID, but also in this organizational sense, us as communities	
48. Learn, I would say, another dimension of life that, perhaps in a world that is very, very individualized, we realize that we are very much aware of each other, that when it happens once it happens very quickly and to another, that we are part of one larger system, and it is very important to balance this measure of both	
49. Impressed by COVID, impressed by the people who were on the streets and it was relatively cold, I had the impression that Armageddon was happening, I was just waiting for another volcano to open up, I thought it was really the end of the world, at that moment just felt some anger	
50. Reviews that were negative towards all this, towards people who are far from reality, from events, who accuse and do not know at all what they are talking about	
51. All these events have the potential to reset a man and bring him back to the point where he must be, every day he must always think what he is	

52. Man, remember that you are dust and that you will turn to dust. This sentence is not in vain, because through this reference point of one's own mortality, one must have a better life, a better life, one can live much better when one realizes that what is left of life and what is life must not be wasted, it must serve something, and it can only serve something if it is good	

Category - VALUE
Emotional aspect: High level of compassion with members of the community with intense self-experience of the crisis situation
Hierarchical aspect: Focus on horizontal connection and action
Cognitive aspect: Rational crisis management based on existing knowledge, intuition and personal experience

Agent D

Parts of the text from the interview	Micro-terms
1. The care of the president of the health staff, today with a backlash, that feeling was a matter of emotional, not rational intelligence	The beginning of the epidemic is described by the health care staff, but by harassing children with measures (1, 2, 8)
2. People were silent, scared, armed with masks... children drew staff members as saviors	The good thing ... to know people better (3)
3. The good I personally experienced throughout the story is that I got to know people better; VERY BAD, is that it was already clear in the first days that dialogue between scientists and doctors is not possible	Dialogue between scientists and doctors impossible (3)
4. A fear pandemic far more dangerous than the disease itself	Fear more dangerous than disease (4)
5. Collateral pandemic victims are not registered anywhere	Collateral victims were not registered (5)
6. I stopped watching TV because it is useless, mentally and morally harmful	You must pray for travel between counties (7)
7. I humbly asked for a pass for Stančić	MSM does the dirtiest job (6, 9, 10, 13)
8. The course of the pandemic is carefully prepared and guided by the main goal - the vaccine	
9. In a negative sense, MSM (mainstream media) have done and still do the dirtiest job, tent, arena, going into the rooms of people who are dying, cause me disgust	Lying in the media (6)

10. False notifications of a girl from the death of covid-19	
11. Prohibition of work, online teaching, child abuse	Prohibition of work, online teaching (11, 12)
12. Closing shops on Sundays?	
13. Some scientists and physicians who did not fit into the narrative of the pandemic were eliminated from MSM	
14. Medicine has taken on more political significance	Unreasonable measures - more political than health measures (14)
15. Citizens seek FREEDOM of decision-making, living, dialogue	Seeking for freedom and dialogue (15)
16. Holy DISABLED dialogue	
17. Lockdown for Easter and Christmas, explained to me a lot about the hierarchy of the church	God's intervention... corrective exam (16, 17, 19)
18. To what extent were the unreasonable measures political and to what extent health measures?	Unreasonableness of health and policy measures; one-mindedness cost a life (18)
19. I experienced God's intervention as a corrective test	Solution - only interdisciplinary, and dialogue (20-23)
20. A better solution can only be found through dialogue and interdisciplinary	To teach man humility; no humiliation (20-23)
21. One-mindedness cost us a lot of lives	What's in the future: open schools, select staff, reform school curricula, love children, hard work ... reap the benefits after generations (20-23)
22. Educate a man, teach him humility, not the humiliation we experience today	
23. Open schools, carefully select teaching staff, reform school curricula, and love children.... after the new generations grow up to reap the fruits of hard work	

Category - VALUE
Emotional aspect: Anger and distrust toward the staff and MSM (causing fear in the population)
Hierarchical aspect: Faith in the first place, the role of the church
Cognitive aspect: Rationality and analyticalness, education and education reform, interdisciplinarity and dialogue

Experiencing the work of agents in a pandemic - a selection of interview parts

Agent A

- *I experienced the pandemic as a professional challenge*
- *I felt in need of action*
- *although it was very hard and demanding, I had a oa feeling that I was contributing and giving something,it was very important to me, not just complaining that something should not be done, because it is always easy to be a critic*
- *tI knew exactly what I needed to do, you set up a team first, you do everything I teach students, I train people, it was happening in practice now, only what was different from what I expected was that pressure around the public*
- *owhat was different from what I expected was the pressure around the public and later, which was politicized, then different "hates" started and so it was something that came to me unexpectedly, but this part I am quite readily welcomed it, expertly*
- *one of the most important things was not to allow some people to simply be left to the forces of nature, not to prevent death*

IN BRIEF: professional challenge (knowing what and how to do) and the need for action in terms of communication with citizens (digital assistant), in terms of acting on anti-epidemic measures (enrichment of knowledge and argumentation through knowledge) and organizational (homes for the elderly); a positive feeling of "giving something".

Agent B

- *We started preparing us immediately in agreement with the key services in my institution and practically after about 15 days the Ministry of Health, along with the Clinic for Infectious Diseases "Dr. Fran Mihaljević "and the Croatian Institute of Public Health, declared the Reference Center for COVID-19*
- *We have already asked the Ministry's consent to be aware of everything that will happen, and we know that Zagreb is the largest urban conglomeration in Croatia, that practically 1/4 of the whole of Croatia lives here, i.e. 1/3*

of the whole of Croatia gravitates to Zagreb, we are aware were what was waiting for us and we were preparing for it so that in March, 15 , we are aware were what was waiting for us and we were preparing for it so that in March, 15. we got permission from the Ministry of Health to start testing

- *we immediately set up a container, , i.e., we first tested there in front of the cafe, then we set up the containers uwhere testing was performed, then there was a relatively small number of positives, then we realized that we could test a maximum of 70 people a day, respecting all measures. every 10 minutes one person because we disinfected the chair and the interior and so on, and then in late March, or early April, we decided to go, with our drive-in which in some people even caused ridicule, but proved to be an example best practice*

- *in the meantime we procured equipment that was almost impossible to get to, it was abnormally difficult conditions, that is, the prices went wild, everything skyrocketed, not just protective equipment.*

- *Huge stress because you really want to do your best.*

- *I must say that the City met our needs to the maximum, d, that our procurement was an absolute priority, new dregulations were adopted regarding public procurement for the needs of COVID, so it went fast, and we succeeded with personal contacts of all our leading people to procure both equipment and consumables on time*

- *people worked for 17 hours, there was no such big device that we later bought and then I agreed with two other institutions that they jump in, to take 500 a day so we do it, that people can come back, because there was one jedno big dissatisfaction and you have seen a lot of articles in the media, which is logical*

IN BRIEF: preparation for a new situation (agreement with the services for epidemiology and clinical microbiology). Approved consent of the Ministry of Health (until the permit to start testing), installation of test containers (in compliance with the prescribed measures - distance, disinfection, etc.), introduction of Drive in (innovation as an example of best practice), adopted new regulations on public procurement, procurement of equipment (the problem of rising prices of equipment and consumables, enormous stress), hiring more new institutions. Positivity is manifested in the rapid action and cooperation between the City and the Ministry.

Agent C

- *We, who are in the surgical profession, were surprised in some way and had to start living in a completely different mode.*
- *What was also a problem was dealing with the lack of equipment*
- *borrowed from health centers that had some small reserves, 10 masks each*
- *that part of the procurement of equipment was particularly stressful because everything that was agreed today was not valid tomorrow*
- *very quickly health facilities were closed, very quickly we had to make certain decisions about hiring hospitals*
- *we quickly had to change our strategy to strengthen nursing homes and social institutions, health facilities, with equipment*
- *functioning through COVID clinics and contact with such patients in general, I would say, nneurotized a lot of primary care physicians and all of us, so it took people a long time to transform into this new role where COVID became, I would say, dominant disease. Everything else was somewhere in the background*
- *both, as a person and by function I was part of the expert group of the Ministry of Health where all relevant persons were discussed and, in some way, tried to find the optimal solution in setting the strategy*
- *The results we had were encouraging, so to speak, in relation to what was happening in other European countries, I have always considered and attributed this to the existence of a good legacy of Andrija Štampar's teachings, a good legacy of the infrastructure we brought, and health centers and the Teaching Institute that we had... all that, in fact, makes this platform for public health... and I would say that this event with COVID, i.e. the global epidemic, showed how important the structure of public*
- *embodying the solidarity kthat existed, and they showed that strength of togetherness, collectivism and how much we are directed at each other*
- *In the beginning, there was a lot of criticism that we simply did not follow the rules, that is, that we came out of some rules*

IN BRIEF: surprise at the new situation, neuroticism of the participants. Problems with the procurement of protective equipment and the need to transform health facilities (people, COVID clinics / hospitals...) and finding optimal solutions in setting the strategy (discussions within the expert group of the Ministry of Health, procurement of equipment, etc.). Positivity is manifested through the good legacy of public health infrastructure (the legacy of the teachings of Andrija Štampar), solidarity and togetherness of all participants.

Agent D

- *Regarding TV and the Internet, I followed the initial reports of the Headquarters and when the pain allowed me, I searched the Internet. The first thing I found unusual was the "concern" of the President of the Headquarters for the Health of the Elderly.*
- *Today, (October 2021) looking back, I think that strange feeling of distrust, which I remember well, was a matter of emotional, not rational intelligence.*
- *The people I met (I went to therapy at the time to get back on my feet) were silent, scared, "armed" with masks and spent disinfectant in enormous quantities.*
- *The instructions of the Headquarters were a law that was unquestioningly obeyed. I remember that the children in the school (at least MSM presented it that way, in word and picture) drew the members of the staff as saviors from the "evil" disease. My own, grown-up, kids kids called several times a day and asked if we were okay. They were obviously very scared because we belong to a "risky" population. I tried to reason with them. In vain.*
- *Bad, I personally think VERY BAD, is that it was already clear in the first days that dialogue between scientists and doctors is not possible, and that it is a pandemic of fear*
- *I stopped watching TV because it was completely useless, and I felt it was very harmful to my mental and moral health. The harmfulness of discontinued therapy after lock-down has been felt on my back for months.*
- **IN BRIEF:** monitoring the Headquarters report, searching the Internet, feeling distrustful of information (inadequate dialogue between scientists and doctors). Fear among the citizens (armed with masks, consuming enormous amounts of disinfectants). Lock-down results in health consequences for non-COVID patients (own experience).

Re-interview ("reflection on reflection")

After the analysis of the interview, we sent it to our respondents for review, and asked them for a re-meeting where we conducted a post-reflective interview in order to relive the experience after a time lag of 5 months.

We conducted the second interview in November 2021 with two agents (agent A and agent C), and we asked them the following questions:

1. *Can you name an event from the beginning of the pandemic that was most impressive to you? What do you remember the most?*

   With this question, we tried to mentally bring the agent back to the state from the beginning of the pandemic. Recalling a specific event, the agent will return to the emotions he experienced and other events that took place in the beginning. For example, it could be the most stressful event or a day that he / she has especially remembered.

2. *Now that we look back at the situation from the beginning of the pandemic, given the conversation we had in June, what was the most successful?*

   In this part of the conversation, we reiterated some key events that the agent mentioned in the first interview as particularly important to him, and we asked him to point out to us what he considers (his) greatest success.

3. *What was less successful? And what could be done differently? (Now from this perspective, once you have some experience, to re-enter the same role and the same situation from the beginning, what would you do differently?)*

   Continuing with the previous question, we asked the agent to point out to us what he thinks was unsuccessful and whether it could have been done differently, or to act in the same situation next time..

Both agents are satisfied with their personal work in managing the COVID-19 pandemic and would not change much. They believe that they have done the best they could and that they have achieved certain successes that were crucial in their scope of work (managing a pandemic in nursing homes, procuring strategic equipment). Both conclude with a dose of self-criticism that they are aware that there is always room for improvement, both in their scope of work and even more so at the level of society (involvement of politics, interest groups, citizens' responsibility). Both agents have a strong empathy for their users (citizens, the elderly, health professionals).

Below are parts of the interview:

Agent A

...The only thing I was convinced at the time was that we would get better vaccinated and that we would have a better situation in the fall. In the meantime, we conducted research in nursing homes, we introduced a third dose and it's still a good story, it's the nice thing I'll always remember from this epidemic because we had one of the more successful stories in nursing homes ... I gave significant effort, I worked pressure, lobbied ... I remember for that third dose, for that vaccination, we ended up introducing it a month later than I think we should and could, but we did introduce it before the EMA gave approval. The EMA gave approval only to the immunocompromised.

The vaccination campaign was not structured, fake news was released too much, too much ... now we have the consequences.

I wouldn't be much different here ... I'm looking at what we, as a society, have missed in general. I would organize research on the reasons for non-vaccination, I expected someone else to do it, either the Croatian Institute of Public Health or the Institute for Social Research ... but maybe I would encourage that more. Fake news would rather be brought into public discourse and put pressure on it to suppress it ... disinformation got out of our control. There is that everywhere in the world, but more responsible governments treat it accordingly.

Agent C

The most stressful thing for me was when I realized that I had to get masks by 8 o'clock for the ambulance crews to go out on the field. Faced with the situation that I must find adequate equipment in a relatively short time, and I considered myself responsible for the system to work and when we collected 10 masks in health centers to survive without anyone knowing it was happening. In fact, it needed to be done quickly. I really at 8 o'clock, personally, brought to the emergency room masks, which we borrowed from health centers.

Sure, it can always be better ... but we included all relevant people, and I must admit that we communicated phenomenally, with the directors of institutions ... when it "creaked" they would always contact us, and we created that reserve (protective equipment), we kept the system, so to speak, we provided some level of reserve ...

I, personally, would ask all these people who don't believe in the vaccine to write on a piece of paper why they think it's not good. To defend their

position, to explain it, what they are afraid of. And then it would be far more understandable to us where the problem is. A total distrust has been created. There have always been different opinions, but the most important thing is that at the community level you have a healthy relationship, and that healthy relationship will, in fact, come from truth, trust, solidarity.

Conclusion

Epidemiology and public health know what to do in crisis situations (for health): measures; organization of health capacities - addition of new institutions for testing and treatment; introduction of innovations - drive-in, digital assistant for communication with citizens; procurement of equipment and consumables; cooperation with politics - City, Ministry of Health; a solid starting base based on Stampar's teaching and organization of public health. Great engagement of medical staff: "17 hours of work".

Emotions: initial surprise (health care facilities and staff), professional challenges, positive feeling that something is "given", cooperation of profession and politics at various levels, feeling neglected by patients with other diagnoses, fear among citizens.

Problems: public pressure

Comment

The conducted analysis refers only to a part of the information that can be obtained from complete interviews. More complete information that can be obtained from reflective interviews requires additional study analysis.

Phenomenology provides in-depth insight into the study of specific public health phenomena such as the **COVID-19** pandemic, taking into account the experience of the agent.